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SYDNEY, SATURDAY, FEBRUARY 12, 1955

No. 7

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CONSERVATIVE VERSUS RADICAL TREATMENT OF BLADDER TUMOURS.¹

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An evaluation of the treatment of bladder tumours and a comparison of the results obtained by different methods are valuable to the clinician; they guide him in deciding on the best treatment to use in a given case.

The results of a study of 251 patients with bladder tumours are given. The case histories were obtained from

our office files; all patients were examined for the first time more than five years before the study was made, and those who did not have a five-year or longer follow-up were eliminated from the series; otherwise the cases are consecutive.¹

Pathology.

The results of treatment are dependent to a great extent on the pathology of the tumour. The important pathological criteria are (i) the degree of malignancy as determined by cell structure, and (ii) the extent of invasion of the tumour.

Broders's classification of the degree of malignancy is used in this study. Grade I tumours are those in which 25% or less of the cells are abnormal in structure and arrangement and 75% or more are normal; grade II tumours are those in which from 25% to 50% of the cells are abnormal; in grade III tumours 50% to 75% of the cells are abnormal; and in grade IV tumours 75% to 100% of cells are abnormal. The grade of malignancy is that reported by the pathologist at the time of the examination of the tissue; histopathological diagnosis was not checked by reexamination of the slides. All tumours reported as papillomata were included as of grade I malignancy. There were a number of pathological reports which did not state the grade of malignancy.

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

¹The statistical calculations in this study were done on "I.B.M." punch cards.

The extent of invasion of the tumour refers to the gross rather than the microscopic invasion, and was estimated at the time the study was made; there was no record of invasion on the patient's charts. The estimate of the invasion was based upon the gross description of the tumour as seen through the cystoscope; the statement in the report of the operation as to whether the tumour was all removed; whether a perforation of the bladder wall occurred before all of the tumour was resected; and when operation was performed through an open approach the description of the extent of the tumour.

The extent of invasion is indicated in this study as follows: A, invasion of the mucosa and submucosa only, practically non-invasive; B, invasion into, but not through, the bladder muscle; C, invasion through the bladder muscle, but not so extensive as to preclude removal of the entire local growth; D, involvement so extensive that only palliative measures could be used.

It was not possible in all cases to estimate accurately the amount of invasion of the tumour, but it is probable that these estimates have not a greater than 10% error.

Some correlation was found between the grade of malignancy and the extent of invasion. Almost all the grade I tumours were A grade in their invasion; the majority of grade II tumours were B grade in invasion; and the tumours which invaded through the bladder wall and those which extended beyond the bladder were mostly grade III and grade IV in malignancy.

The most simple and probably the most accurate means of evaluating the success of treatment is by a study of the time of survival following treatment. Five, ten and fifteen year survival rates are given. The percentage of survivals in each five-year period is based upon the total number of patients who had their first treatment five years before the study was made. For example, all the patients had their first treatment more than five years before the study was made, therefore the percentage of five-year survivals is based on the total number (251 cases). One hundred and forty-three patients (57%) had their first treatment more than ten years before the study, therefore the percentage of ten-year survivals is based on a total of 143 cases. Similarly, 49 patients (20%) were first treated more than fifteen years before the study, so the percentage of fifteen-year survivals is based on a total of 49 cases. Results of treatment based upon a period of follow-up of less than five years are not very significant in determining the efficacy of the treatment; therefore no cases are used in this series in which treatment was first given less than five years before the study was made, and in which the follow-up period was less than five years.

The time of survival following treatment is a much better method of evaluating the efficacy of treatment than is the recurrence rate of the tumour. The majority of bladder tumours do recur after treatment—in the bladder and perivesical spaces when conservative treatment is given, and in the subpubic space when cystectomy is performed. Tumours have been known to recur in the bladder, in the retroperitoneal nodes or elsewhere as long as fifteen years after the initial destruction of the tumour. Some authorities (Franksson, 1950) consider the recurrence rate the most significant criterion of cure. Although the absence of recurrences is a good indication of the effectiveness of treatment, it is well known that some patients may survive more than five years with many recurrences, while others succumb in less than five years with only one or two recurrences, or none at all. Therefore it is our opinion that length of survival gives the most practical estimate of the effectiveness of any method of treatment. There are also other factors resulting from the treatment which influence survival, such as surgical mortality and disease in the upper part of the urinary tract. The prime objective of treatment is to keep the patient in good health as long as possible; the method of treatment which does this is the best treatment.

A study is made of the results obtained by the different methods of treatment used in this series, and the literature is reviewed so as to make a comparison with series of cases reported by other authors.

Conservative Surgery.

The term conservative surgery as used in this study refers to all methods of treatment other than complete cystectomy; it includes transurethral fulguration or electrocoagulation, transurethral resection, suprapubic electrocoagulation and resection and suprapubic segmental resection, or partial cystectomy. Irradiation by the use of radon emanation seeds and by X-ray therapy was used in addition to surgery in some cases.

Conservative surgery was used in 245 cases in this series.

Survival following Different Methods of Treatment.

Some reports from the literature of the five-year survival rate of patients with all types of bladder tumours treated by all methods are given in Table I (Royce and Ackerman, 1951). It is estimated that 10% of all patients with bladder tumours will survive for five years if no treatment is given.

TABLE I.¹

Reports of Five-Year Survival Rates: All Types of Treatment and All Grades and Invasions of Tumour.

Source.	Number of Cases.	Five-Year Survival Rate.
Barnes Hospital	135	28.0%
Memorial Hospital (Marshall) ² ..	316	17.0%
Mayo Clinic (Counsellor and Walters)	600	28.0%
Bladder Tumour Registry	902	33.24%

¹ From Royce and Ackerman, 1951.

² Grade I transitional cell carcinomata not included.

The Present Series.

In the calculation of the survival rate all patients who died were included, whether they died of the bladder tumour or from some other cause.

The five-year survivals include all patients who survived for five years or longer, the ten-year survivals include all who survived ten years or longer, and the fifteen-year survivals include all who lived fifteen years or more.

TABLE II.

Survival Following Transurethral Fulguration or Electrocoagulation.

Grade of Malignancy: Degree of Invasion.	Number of Cases.	Five-Year Survival: Number of Cases.	Ten-Year Survival: Number of Cases.	Fifteen-Year Survival: Number of Cases.
Malignancy:				
Grade I	8	7	7	5
Grade II	6	5	3	1
Grade III	3	2	1	0
Grade IV	0	0	0	0
No grade recorded	15	11	4	1
Invasion:				
A	22	20	14	7
B	9	5	1	0
C	0	0	0	0
D	1	0	0	0
Total	52	25 (78%)	15	7

The survival of patients who had transurethral fulguration or electrocoagulation as the initial treatment is given in Table II. This method of treatment was used for the majority of patients who were examined before transurethral resection was used, therefore most of them were first treated more than ten years ago. In these cases the degree of invasion could not be measured accurately, but an estimate was made from the description of the lesion. There is an overall five-year survival rate of 78% in this group.

The survival of patients who underwent transurethral resection of the bladder tumour is given in Table III. Patients who underwent transurethral resection first and later a segmental resection (partial cystectomy) or radical cystectomy are included in the series dealing with the more extensive procedures. The overall five-year survival rate of the group in which transurethral resection was performed is 54%.

TABLE III.

Survival Following Transurethral Resection of the Bladder Tumour (Both With and Without Radon Seeds).

Grade of Malignancy: Degree of Invasion.	Number of Cases.	Five-Year Survival: Number of Cases.	Ten-Year Survival: Number of Cases.	Fifteen Year Survival: Number of Cases.
Malignancy:				
Grade I	37	30	14	1
Grade II	38	15	3	0
Grade III	32	4	2	0
Grade IV	4	0	1	0
No grade recorded ..	51	37	17	3
Invasion:				
A	83	67	28	4
B	44	17	9	0
C	23	3	0	0
D	12	0	0	0
Total	162	87 (54%)	37	4

Irradiation, when used, was not the only mode of treatment, but was employed in conjunction with other treatment. Radon seeds of 1.5 or 2.5 millicuries were implanted into the tumour-bearing area of the bladder wall and were spaced about one centimetre apart. In most cases they were implanted through the cystoscope after transurethral resection of the bladder tumour. In our series there were so few cases in which other types of irradiation were used that the results are not significant.

TABLE IV.

Survival Following All Types of Treatment: With and Without Radon Seed Implantation.¹

Grade of Malignancy: Degree of Invasion.	Radon Treatment.		No Radon Treatment.	
	Number of Cases.	Five-Year Survival.	Number of Cases.	Five-Year Survival.
Malignancy:				
Grade I	4	2	41	34
Grade II	20	8	35	14
Grade III	21	2	28	9
Grade IV	2	1	8	3
Not recorded	10	5	84	48
Invasion:				
A	17	10	94	80
B	23	7	48	22
C	14	1	27	6
D	3	0	25	0
Total	57	18 (32%)	194	108 (56%)

¹ Ten- and fifteen-year survivals are not given, because so few patients who were first examined ten and fifteen years ago were treated with radon.

Radon seeds were infrequently used, in the following circumstances: (i) in the treatment of patients whose tumour was less malignant than grade II; (ii) in the D invasion group, in which the tumour was so extensive that only palliation was possible. Papillary tumours of less than grade II malignancy almost never recur at the site of the original neoplasm; therefore the implantation of radon seeds in that site would be useless. Radon seeds implanted into extensive tumours do not accomplish

enough palliation to be worthy of use. A comparison of those who had radon implantation with those in whom no radon was used shows no significant difference between those who were treated with radon and those who were not (Table IV). The five-year survival for those treated with radon is 32%, as against 56% for those who were not so treated. The 10-year and 15-year survival rates are not given, for radon seeds were used in the treatment of only a very few patients who were examined ten and fifteen years before the study was made. The larger percentage of five-year survivals in the group of patients who were not treated by radon is probably due, at least in part, to the fact that radon was used for so few of those who had papillomata or grade I tumours. There is apparently no benefit from the use of radon seeds in the higher grades of malignancy.

The results of X-ray and radium therapy without other treatment have not been encouraging. Marshall (1947) has reported 15% to 20% of five-year survivals and about 6% of cures in 500 patients treated by irradiation at the Memorial Hospital and the New York Hospital. Lenz, Cahill and their associates (1947) report 23% of five-year survivals following transurethral implantation of radon needles in 44 patients; the results were best in small papillary tumours.

TABLE V.

Survival after Resection and/or Fulguration (Electrocoagulation) through the Suprapubic Approach.

Grade of Malignancy: Degree of Invasion.	Number of Cases.	Five-Year Survival: Number of Cases.	Ten-Year Survival: Number of Cases.	Fifteen- Year Survival: Number of Cases.
Malignancy:				
Grade I	0	0	0	0
Grade II	7	2	1	1
Grade III	3	0	0	0
Grade IV	0	0	0	0
No grade recorded ..	8	2	1	0
Invasion:				
A	1	1	0	0
B	6	2	1	1
C	6	0	0	0
D	4	0	0	0
Not recorded	1	0	0	0
Total	18	4 (22%)	2	1

Table V gives the survival rate for cases in which resection and fulguration (electrocoagulation) were performed through a suprapubic approach; the tumour was removed in pieces by means of a large loop electrode, and the base fulgurated. This treatment was used for most patients who had a tumour which was too large to remove through the transurethral approach. Radon seeds were used in very few of these cases; the extensive nature of the growth precluded their use. A comparison of this method with transurethral resection is not significant, because this type of open surgery was used for the larger sized, more extensive tumours, and the results would not be as good because of the more extensive involvement. The number of cases in this group is so small that the data are not significant. There were only 22% five-year survivals in this group.

Suprapubic segmental resection (partial cystectomy) was performed for the most part on patients in whom the tumour was located in the dome of the bladder, where it was difficult to reach with the resectoscope through the urethra. In a few cases the tumour extended to the lateral bladder wall and floor on one side; when the ureteral orifice was involved the ureter was reimplanted into the bladder at a higher position. Table VI gives the survival of patients in this group (50% five-year survivals). The number of cases in this group is so small that the figures are not very significant.

A comparison of survival rates in the groups having different kinds of treatment is given in Table VII. These are the total number of cases in each group without reference to grade of malignancy or extent of invasion. The group in this series in which cystectomy and ureteral transplantation were performed is too small to be of value for comparative purposes.

TABLE VI.
Survival After Suprapubic Segmental Resection (Partial Cystectomy).

Grade of Malignancy : Degree of Invasion.	Number of Cases.	Five-Year Survival : Number of Cases.	Ten-Year Survival : Number of Cases.	Fifteen- Year Survival : Number of Cases.
Malignancy :				
Grade I	0	0	0	0
Grade II	1	0	0	0
Grade III	3	2	0	0
Grade IV	4	3	1	0
No grade recorded ..	6	2	2	2
Invasion :				
A	0	0	0	0
B	8	5	3	2
C	5	2	0	0
D	1	0	0	0
Total	14	7 (50%)	3	2

A summary of all cases in which conservative surgical treatment was used is given in Table VIII. This includes transurethral fulguration or electrocoagulation, transurethral resection, suprapubic resection and fulguration, and partial cystectomy. It also includes cases in which radon implantation was used in addition to the above-mentioned treatments. There were 245 patients treated by conservative surgery. This group had a 52% five-year survival rate.

TABLE VII.
Comparison of Survival Rates After Different Kinds of Treatment : Total of All Grades of Malignancy and Degrees of Invasion.

Treatment.	Number of Cases.	Five-Year Survival : Number of Cases.	Ten-Year Survival : Number of Cases.	Fifteen- Year Survival : Number of Cases.
Transurethral fulguration or electrocoagulation ..	32	25	15	7
Transurethral resection only ..	154	86	36	4
Transurethral resection and implantation of radon seeds ..	57	18	0	0
Suprapubic resection and fulguration ..	18	4	2	1
Suprapubic partial cystectomy ..	14	7	3	2
Cystectomy and ureteral transplant ..	5	2	0	0

Most of the tumours in this series were transitional cell carcinomata; there were a few other types. The survival rates for the different types of tumour are shown in Table IX. Tumours reported as papillary are included as transitional cell tumours.

The percentage of cases and the survival rate in each age group are given in Table X. The decreased survival rate in the eighth and ninth decades is probably due to deaths from other causes. In the entire series there were 158 patients who were known to have died. Ninety-four or 60% of these were known to have died of cancer, in 31 (20%) cases the cause of death was not known, and 33 (21%) of the 158 died of causes not related to the bladder tumour.

Comparison of Results of Conservative with Those of Radical Surgery.

Total cystectomy with ureteral transplantation into the sigmoid colon or into the skin was performed in so few cases in this series that the results are not significant (Colby and Kerr, 1951).

A review of the literature reveals a few reports of five-year survivals following cystectomy and ureteral transplantation. Table XI gives a comparison of five-year survivals in different series of cases which have been reported. From these data it is difficult to make an

TABLE VIII.
Survival in All Cases After Conservative Surgery (All Cases Except Those in which Total Cystectomy was Performed).

Grade of Malignancy : Degree of Invasion.	Number of Cases.	Five-Year Survival : Number of Cases.	Ten-Year Survival : Number of Cases.	Fifteen- Year Survival : Number of Cases.
Malignancy :				
Grade I	45	38	22	8
Grade II	53	23	8	3
Grade III	46	10	3	0
Grade IV	10	4	2	0
No grade recorded ..	91	52	24	6
Invasion :				
A	108	92	44	14
B	71	29	15	3
C	36	5	0	0
D	27	0	0	0
Not recorded ..	3	1	0	0
Total	245	127 (52%)	59	17

accurate comparison between the results of conservative surgery with those of cystectomy, for all factors other than the surgical procedures are not similar in the two groups. However, there is evidence that the survival rate in the group treated conservatively is greater than that of those who underwent cystectomy. Colby and Kerr (1951) compared the five-year survival rates of cases at the Massachusetts General Hospital. For tumours which invaded

TABLE IX.
Survival Rate in the Different Types of Tumours (All Grades of Malignancy and Depths of Invasion).

Type of Tumour.	Number of Cases.	Five-Year Survival : Number of Cases.	Ten-Year Survival : Number of Cases.	Fifteen- Year Survival : Number of Cases.
Transitional (includes papillary)	130	74	34	8
Squamous	38	8	3	0
Adenocarcinoma	7	2	0	0
Leiomyosarcoma	1	0	0	0
Not recorded	75	44	22	10
Total	251	128 (50%)	59	18

the muscle there was an 11% five-year survival rate when cystectomy was not performed, and an 8% survival rate after cystectomy; 100% of patients with non-invasive tumours lived five years after conservative treatment, and only 16% after cystectomy.

The surgical mortality following cystectomy and uretero-sigmoidostomy is one reason why the survival rate of this group treated by radical surgery is less than when conservative surgery is used. Table XII gives the surgical mortality of the radical procedure as reported by several

authors, and a comparison is made with the group treated by conservative surgery. It is, of course, not surprising that the surgical mortality from a conservative operation is considerably less than that from a radical procedure; however, the risk of surgery is one thing which must be considered when a decision is being made upon the operation to be performed in a given case.

TABLE X.
Percentage of Tumours and Survival in Age Groups (Decades).¹

Decade.	Number of Cases.	Five-Year Survival: Number of Cases.	Ten-Year Survival: Number of Cases.	Fifteen-Year Survival: Number of Cases.
First to third	0	—	—	—
Fourth	8	6	5	0
Fifth	24	18	7	3
Sixth	60	39	20	6
Seventh	87	39	15	4
Eighth	54	20	8	1
Ninth	13	2	0	0

¹ Fourth decade, thirty to thirty-nine years; fifth decade, forty to forty-nine years, *et cetera*.

Hazards of Ureterosigmoidostomy.

There are hazards to the transplantation of the ureters into the sigmoid colon. Renal infection was the cause of 66% of late deaths and 50% of surgical deaths in a series of 144 cases of ureterosigmoidostomy for exstrophy of the bladder reported by Harvard and Thompson (1951). Infection may be forced up the ureteral lumen by intracolic pressure. Cordonnier and Lage (1951) reported the roentgenographic demonstration of gas in the renal pelvis in five of 54 patients. Gas and faeces may escape from the nephrostomy tube after mucosa-to-mucosa anastomosis, and 21 of the 54 patients (38.9%) of Cordonnier and Lage had renal infection within two and a half years. Table XIII gives a summary of some of the reports of renal infection following ureterosigmoidostomy.

TABLE XI.
Comparison of Five-Year Survival Rates as Reported by Different Authors.

Authors.	Number of Cases; Malignancy and Invasion.	Five-Year Survival Rate.
Conservative surgery:	Invasion.	
Flocks (1951)	540 A—108 cases B—249 cases C—123 cases	75% 40% 1%
	Total 540 cases	44%
Creevy (1953)	Early malignancy.	78%
Cook and Kimbrough (1953)	51	86%
Barnes <i>et alii</i> (1954)	245; all grades and degrees of invasion.	52%
Cystectomy and ureteral transplant:		
Ferris and Priestley (1948)	119	19%
Jacobs (1951)	46	0%
Colby (1952)	51	8%
Whitmore and Marshall (1953)	122	18%

Stenosis at the site of anastomosis is a common cause of renal damage; it results in dilatation and infection of the upper part of the urinary tract. Table XIV gives a summary of some of the reports showing the effect of ureterosigmoidostomy on the kidneys as shown by excretion urography (collected by Creevy, 1953). There is an average of only 31% of cases in which the kidneys remained normal after ureterosigmoidostomy.

Hyperchloramic acidosis resulting from absorption of urinary constituents from the lower bowel is a common sequela of ureterosigmoidostomy. In Creevy's series of 81 cases the plasma chloride content and carbon dioxide combining power were measured between one month and

sixteen years after operation; hyperchloramic acidosis was found in 59.2% of cases, although symptoms were present in only 12.3%.

The survival rate after ureterosigmoidostomy for exstrophy of the bladder was compared by Creevy with the normal survival of boys aged ten years. Boys were chosen because exstrophy is twice as common in them as

TABLE XII.
Surgical Mortality.

Authors.	Number of Cases.	Surgical Mortality.
Conservative surgery:		
Barnes <i>et alii</i> (1954)	245	5%
Burford (1950)	525	3%
Flocks (1951)	293 ¹	6%
Radical surgery:		
Hinman and Smith (1939)	254	34%
Priestley and Strom (1943)	60	30% (operations performed 1910 to 1947)
		7% (operations performed 1942 to 1943)
Helstrom (1947)	52	21%
Marshall and Whitmore (1950)	119	13%
Ferris and Priestley (1948)	119	16%
Dean (1950)	99	20%

¹ Transurethral resection.

in girls, and the age of ten years is used because this is about the average age at which the operation is performed. Figure 1 shows that the expected survival during the first twenty years after operation was reduced by 50% in the series reported by Harvard and Thompson (1951).

TABLE XIII.
Renal Infection Following Ureterosigmoidostomy: Summary of Reports in the Literature.

Authors.	Number of Cases in Series.	Percentage of Renal Infection.
Smith (1947)	54	33.3
Cordonnier and Lage (1951)	54	38.9
Harvard and Thompson (1951)	69	67.0

Treatment Indications.

Indications for the different kinds of treatment for bladder tumours vary greatly among urologists, from those who advocate radical cystectomy and removal of all retroperitoneal glands to those who believe transurethral resection is best for most patients. W. F. Leadbetter

TABLE XIV.
Summary of Data from Literature Indicating Effect of Ureterosigmoidostomy on Urographic Appearance of Kidneys. (Quoted by Creevy.)

Authors.	Number of Cases.	Interval. (Years.)	Kidneys Normal.
Lapides	22	Half to 1	5
Pool and Cook	43	Half	5
Dean	99	Half	42
Harvard and Thompson	41	Half to 35	5
Creevy and Reiser	58	Half to 16	23
Total	258	—	80 (31%)

(Leadbetter and Cooper, 1950), Victor Marshall and others are now performing radical cystectomies, which include the removal of all retroperitoneal glands, in many of their cases. Sufficient time has not yet elapsed to evaluate the results of this procedure. The technique is difficult and the operation is lengthy. Until it is more adequately

evaluated, its performance should be limited to experienced surgeons working in large centres.

The performance of cystectomy and ureterosigmoidostomy without gland dissection is also heavy surgery. After consideration of the post-operative mortality the low cure rate and the hazards of ureterosigmoidostomy, it is our opinion that more conservative surgery is preferable. There are some cases in which diversion of the urinary stream is indicated and a few in which cystectomy should be performed—patients in whom there is uncontrollable bleeding, those with marked frequency and urgency, and bladder pain from advanced bladder carcinoma may be relieved by ureterocutaneous anastomosis or by ureterosigmoidostomy. The transplantation to the skin is a much lighter procedure and is performed on the patient who is a poor surgical "risk". When symptoms persist after diversion of the urine, cystectomy may be indicated for relief of these symptoms if the patient's general condition is good.

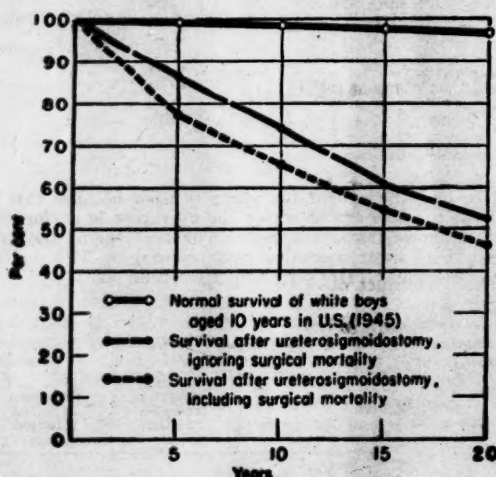


FIGURE 1.

Normal survival rate of white boys, aged ten years, compared with survival rates of 38 patients after ureterosigmoidostomy for exstrophy of bladder (Creedy, 1953).

Cystectomy and ureterosigmoidostomy are, in our opinion, not indicated in early bladder carcinoma. The operative mortality, the high incidence of disease in the upper part of the urinary tract following ureteral transplantation to the large bowel, and the low cure rate make this procedure of less value than more conservative treatment. Creedy (1953) has shown that the survival rate after ureterosigmoidostomy alone, without the presence of cancer, is only a little better than the survival rate after conservative treatment of bladder tumours. The increased surgical mortality of cystectomy and the presence of carcinoma would considerably reduce the survival rate after the radical surgical procedure.

Conservative treatment is preferable for early bladder carcinoma, and cystectomy does not cure the disease in the far-advanced stage. Does removal of the bladder offer any better prognosis in the moderately advanced stage? There are no statistical data which would definitely answer this question. In our series the 40% of five-year survivals in the B invasion group (into, but not through, the bladder muscle, Table VIII) would indicate that conservative surgery is at least as good as cystectomy. It is possible that the more radical treatment by cystectomy and removal of all retroperitoneal lymph nodes might prove to be the best method for the treatment of this group.

Segmental Resection.

Partial cystectomy is indicated when a tumour is located on the ventral bladder wall. It is difficult to reach this area of the bladder with the resectoscope loop, and

visualization immediately above the bladder neck is usually inadequate. Small, non-infiltrating tumours in this region can be resected transurethraly by having an assistant exert heavy pressure on the bladder under the pubis. The larger and more infiltrating neoplasms situated on the ventral bladder wall should, however, be removed through the suprapubic approach. Sometimes tumours situated in this position are urachal in origin, and these can be more adequately removed by open surgery. Tumours situated elsewhere in the bladder, which are too large or too invasive for transurethral resection, are more easily and more adequately removed by transvesical resection and fulguration.

Suprapubic Transvesical Resection.

Suprapubic transvesical resection with fulguration is the method of choice in the treatment of all tumours which are too large or too invasive for transurethral removal and which are not located on the anterior bladder wall. Tumours which are more than six or seven centimetres in diameter and those which invade through the bladder muscle are included in this group. The extent of invasion can be estimated sometimes by bimanual palpation. The bladder is opened widely through a suprapubic extra-peritoneal approach. The tumour mass is removed with a large loop, the cutting current being used. The larger bleeding vessels are coagulated at the time, and the smaller ones are left until all the tumour has been removed. A suction tube is kept near the area being resected to aspirate smoke and blood from the field of operation. A large amount of tissue can be removed in a short time by this technique. Tumour tissue can be differentiated from normal tissue by its appearance and by its consistency on palpation; the tumour is granular, or, in the scirrhous type, homogeneously firm like Swiss cheese. It is also firmer than the normal surrounding tissue; the increased firmness is especially discernible at its junction with normal tissue. Papillary non-invasive tumours are soft. Very highly malignant tumours which are invasive may also feel soft on palpation. When the tumour extends entirely through the bladder wall, perivesical fat appears before any characteristic fibres of the bladder muscle are seen. After all the neoplastic tissue has been removed, the entire area is thoroughly coagulated with a large ball or flat electrode. The electrical current is adjusted so as to avoid charring or blackening the tissues, and the electrode is held against the tissue for several minutes in each area to allow the coagulation to extend deeply into the tissues. When invasion through the bladder wall is extensive, a large area may be left without any bladder wall at the completion of the operation. Sometimes the edges of normal bladder wall can be approximated by sutures to reduce the size of the denuded area, but no great harm results if there is a large defect in the bladder wall unless it opens into the peritoneal cavity. Residual urine may persist for some time after operation, owing to reduced contractile power from absence of bladder muscle. When the tumour involves the ureteral orifice, the resection is performed without regard for the orifice; however, extensive coagulation over the opening should be avoided, for this increases fibrosis and results in stenosis. Constriction may occur after resection of the orifice with the cutting current, but more frequently the ureteral mucosa everts, especially if the ureter is dilated, and healing occurs without stenosis. After transvesical resection and fulguration the bladder is closed tightly in most cases, and a rubber tissue drain is inserted to the prevesical space. A size 24 or 26 Foley bag catheter is left in through the urethra. If the bleeding has not been well controlled, or if there is an extensive absence of bladder wall, it may be advisable to leave a suprapubic catheter in place for several weeks.

In our opinion transvesical resection with fulguration or electrocoagulation is preferable to segmental resection (partial cystectomy) or complete cystectomy for large tumours involving the floor and lateral walls of the bladder. The extensive manipulation of the bladder wall which is necessary in order to perform a complete cystectomy or to remove a portion of the floor or lateral walls of the bladder

probably spreads tumour cells and results in extension of the neoplasm. It is true that a cure can rarely, if ever, be accomplished by suprapubic resection and fulguration of tumours invading through the bladder wall, but neither is a cure effected by cystectomy in such cases unless radical removal of all retroperitoneal glands will accomplish it, which is very doubtful.

Transurethral Resection.

Transurethral resection is the best treatment for most bladder tumours if the surgeon has had training and experience in endoscopic surgery. Tumours located on the ventral bladder wall, especially if they are large or invasive, are difficult to remove adequately with the resectoscope; they lend themselves admirably to partial cystectomy through the suprapubic approach. However, the smaller, non-invasive tumours can be reached with the resectoscope loop and adequately removed by the surgeon's having an assistant depress the ventral bladder wall by exerting pressure with his hand over the suprapubic region and behind the pubis. Tumours which are more than six or seven centimetres in diameter are usually too large for endoscopic removal and should be resected and electrocoagulated through a suprapubic opening. The experienced

resection is inadvertently carried too deep, a perforation of the bladder wall may occur (Figure VI). The importance of recognizing a perforation cannot be over-emphasized; when it is not recognized, extravasation of irrigating fluid occurs and may result in shock, infection,

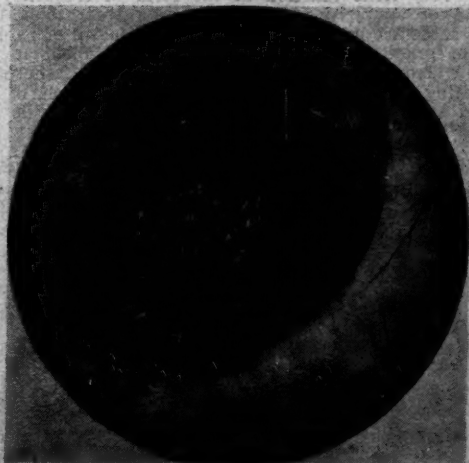


FIGURE II.

Small bladder tumour as seen through the cystoscope.

endoscopic surgeon can remove bladder tumours less than six or seven centimetres in diameter which are not located on the ventral bladder wall as thoroughly by transurethral resection as by any other approach. The tumour is identified (Figure II) and the resection started, pieces being removed from its surface with the resectoscope loop (Figure III). As the tumour is removed, bladder muscle appears (Figure IV). It is very important to differentiate muscle from tumour tissue; muscle strands are coarse fibres and are somewhat glistening; the cut surface of tumour tissue is granular and softer and more dull in appearance. It is necessary to place the inner lens of the resectoscope close to the tissue in order to identify it; the irrigating fluid is also allowed to run in to keep the field of vision clear. Tissue identification can be made more accurately through the resectoscope lens than through an open suprapubic wound, for the lens, when held close to the tissue, magnifies the image. The operator, by identifying tissue, can determine when all the tumour has been removed; bladder muscle is seen throughout the area (Figure V). Bladder mucosa and muscle are resected for a distance of one centimetre beyond the tumour on all sides, and at least one loop of tissue is removed deep to the extent of the tumour. Sometimes the tumour invades through the bladder. When this occurs, or when the



FIGURE III.

Bladder tumour after one piece has been removed by transurethral resection.

acute renal failure or other serious complications. When a perforation is recognized and isotonic irrigating fluid is being used, little harm results unless the bladder is subsequently over-distended and a large amount of fluid is

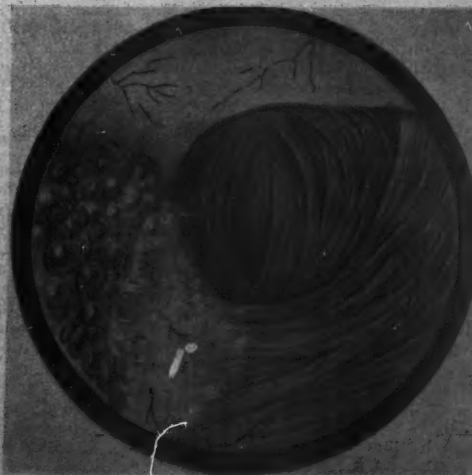


FIGURE IV.

Bladder tumour partially resected. The cut surface of the tumour is granular in appearance. Bladder muscle is in coarse strands and is easily distinguishable from tumour.

extravasated. It is therefore necessary to avoid over-distending the bladder after the perforation occurs. If the tumour has been entirely removed when a perforation occurs, the operation is concluded and a size 24 or 26 five cubic centimetre bag catheter is inserted and left in

for six or seven days, care being taken to see that it drains freely at all times. When the tumour has not been entirely removed at the time of the operation, one of two courses can be taken. (1) The prevesical space is drained as follows: a two-centimetre longitudinal incision is first made immediately above the pubis, the skin and rectus sheath being incised. Blunt dissection with the palpating finger is continued under the pubis and to the side of the bladder where the perforation occurred, and a rubber tissue drain is inserted. The transurethral resection of the tumour can then be completed. (ii) When the patient's condition is not good it is preferable to establish drainage

that recurrences in the subpubic space and in more distant localities are as rapid and as frequent after cystectomy as they are after the more conservative treatment. When there is recurrence in the bladder, transurethral resection can be repeated, but recurrence in the subpubic space after cystectomy is a hopeless situation.

Implantation of Radon Seeds.

Until the present study was made we were of the opinion that the use of irradiation in the form of radon emanation seeds was of some benefit in the control of carcinoma of the bladder. A previous study (Flocks, 1951) indicated that there was more adequate control of the growth by the use of radon seeds. However, the present study does not bear this out (Table VII). The technique for the use of radon seeds is as follows: gold seeds of 1.5 millicuries strength are implanted into the tumour-bearing area of the bladder wall three to four weeks after the operation and after most of the tissue slough has cleared off. They are implanted through the cystoscope and are placed one centimetre apart throughout the resected area, and a row is also placed into the normal bladder mucosa one centimetre lateral to and surrounding the resected area. They are inserted into the bladder wall one to two centimetres deep. In a number of cases 2.5 millicuries strength was used. Very little reaction in the form of frequency or urgency of micturition or pain results from their use. Radon seeds are not indicated after the removal of papillomata or grade I tumours, for these rarely recur in the location from which they were removed; therefore implanting the seeds into the tumour-bearing area of the bladder wall is not necessary, for such tumours do not tend to recur in that area.



FIGURE V.

Tumour completely removed down to bladder muscle.

of the prevesical space as noted above, then discontinue the resection of the tumour and complete it at a future time. A catheter is placed in the urethra for continuous drainage. It may not be necessary to drain the prevesical space if the transurethral resection is discontinued at the time when the perforation occurs and before there is very much extravasation.

• *Complete Removal of Tumour by Transurethral Resection.*—There is an abundance of evidence that bladder tumours can be completely removed by transurethral resection unless they are very large, unless they invade through the bladder muscle, or unless they are located on the ventral bladder wall. Moore and Howe (1953) report three cases and cite eleven others from the literature in which a bladder carcinoma was removed by transurethral resection for biopsy; a few days or weeks later the bladder, removed by cystectomy, showed no evidence of carcinoma. In the cases cited by Moore and Howe, the cure of the carcinoma was attributed to diversion of the urinary stream by ureterosigmoidostomy. It is far-fetched, to say the least, to assume that a carcinoma of the bladder can be cured by mere diversion of the urinary stream for as short a time as a few weeks. The tumour in these cases was eliminated, at least temporarily, by the transurethral resection performed for biopsy. The authenticated cases of cure of bladder tumours by diversion of the urinary stream are so few that this mode of treatment can be eliminated except for palliation. At the completion of the transurethral resection of a bladder tumour it is advisable to save a few pieces of tissue from the edges and from the base of the resected area for special biopsy study; if these pieces show no evidence of tumour it is evidence that all the neoplasm has been removed. It is well known that recurrences of tumour in the bladder are common after conservative treatment. However, there is evidence

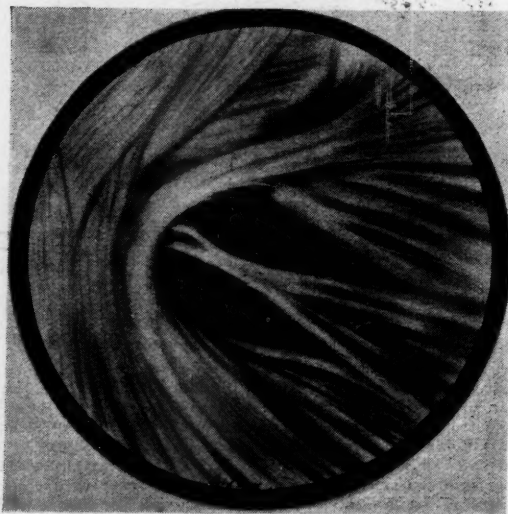


FIGURE VI.

Resection carried through bladder muscle resulting in perforation of bladder wall (dark area).

Follow-up Examination.

Follow-up examinations after conservative treatment of bladder tumours are important in order to find and give early treatment for recurrences. Cystoscopic examination should be carried out every three months on patients whose tumour was of grade II or more malignancy, and every six months on patients with papillomata or tumours of grade I malignancy. If there is no recurrence for two years, the length of time between examinations can be increased to six months, a year or even two years in some cases. Recurrent tumours are resected and electrocoagulated as soon as they are found. If this procedure of frequent

follow-up examinations and removal of recurrences is followed, the situation in most cases can be kept under control for many years.

Palliative Treatment.

Patients with bladder tumours which are far advanced, and those who have demonstrable metastases, are treated by palliation only. There are also a few patients with moderately advanced tumours who are poor surgical "risks" and need palliation only. The urinary stream may be diverted by ureterocutaneous anastomosis if the patient's condition is poor, or by ureterosigmoidostomy if he is a better surgical "risk". If the bladder is put at rest in this way, frequency and urgency of micturition, bladder spasm and sometimes pain and hæmorrhage may be relieved. Cystectomy may rarely be indicated as a palliative procedure when there is uncontrollable hæmorrhage, but usually this can be more safely cared for by transvesical resection and electrocoagulation. The establishment of a permanent suprapubic cystostomy after this procedure may help to relieve symptoms.

Summary and Conclusions.

A study of 245 cases of bladder tumour from our office records shows a 52% five-year survival rate after conservative treatment, mostly by transurethral resection. The use of radon seeds after transurethral resection does not increase the survival rate. This compares with a maximum of about 20% five-year survivals after cystectomy as reported by other authors. The hazards of ureterosigmoidostomy are an important factor in reducing the survival rate after cystectomy.

Most bladder tumours can be treated by properly performed transurethral resection more successfully than by any other means. Meticulous technique, the recognition of tissue as seen through the resectoscope, and the use of an isotonic irrigating fluid are necessary. Tumours larger than seven centimetres in diameter are more suitable to transvesical resection and electrocoagulation, and those located in the ventral bladder wall should usually be removed by partial cystectomy. Careful, persistent follow-up examinations and endoscopic destruction of recurrences are essential to obtain the best results.

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RADIOTHERAPY IN BLADDER CARCINOMA.¹

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THE treatment of carcinoma of the bladder involves three methods: surgical treatment, electrosurgical treatment and radiotherapy. With the first two of these I am not much concerned, except to remark that both methods are strictly limited by the vital nature of the bladder and the predilection of the lesions for the region of the trigone and ureters, and unless total cystectomy is esteemed a feasible procedure, surgery by either method is often impotent.

Radiotherapy, at least theoretically, offers a method of tumour sterilization with retention of bladder function, and its potential use therefore covers a much wider field than surgery, including the more advanced instances of the disease, and even offering palliation in the hopeless cases beyond cure. Nevertheless, the overall picture of results obtained by any method is rather melancholy.

Paterson, of Manchester, as the result of a long experience, considers that radiotherapy is the treatment of choice for all carcinomata of the bladder, and states that the relation of surgery to radiotherapy here has followed the same course as in carcinomata of the mouth, in which radiotherapy is now the first indication after the failure of many years of heroic surgery. He gives a cure rate of 55% in support of this plea, and this is probably the best series of results yet recorded. Whether this will be the final verdict remains to be seen.

At present, when surgery is naturally the first method to be considered, the choice of radiotherapy (if surgery is contraindicated) is made by the urologist. This is, of course, usual in other branches of surgery; but in urology, in addition, the variety of radiotherapy to be used is also usually chosen by the urologist, and the patient is presented to the radiotherapist with a definite decision as to the radiotherapeutic method. This necessarily results from the essentially private preview which the urologist has at the all-important preliminary cystoscopic examination, at which the final decision must be made.

I therefore propose first to discuss some essential fundamentals which should guide the urologist in his choice of radiotherapeutic method, and then to indicate briefly the various technical methods of treatment and evaluate them in the light of these fundamental principles or essential conditions.

Fundamentals in the Choice of Radiotherapeutic Method.

Let us therefore forget the bladder for a moment and consider the treatment of a large squamous-celled carcinoma of the skin. Here we have an epidermal tumour of approximately the same sensitivity as the average carcinoma of the bladder, which in over 90% of instances resolves promptly and permanently after an efficient dose of irradiation.

The reasons may be seen if we dissect the problem. The successful radiotherapeutic treatment of any malignant lesion requires at least three, and possibly four, conditions: (i) There must be some degree of radiosensitivity in the tumour. Some growths, notably neurogenic sarcomata, osteogenic sarcomata and some of the melanomata, are almost completely resistant, and treatment of these can produce nothing more than growth restraint. (ii) The tumour—the whole of the tumour—must be bathed in a more or less uniform high dose, the so-called cancericidal dose, by some technical means or other. (iii) This high dose must be reasonably confined to the tumour and immediate tumour-bearing area.

In actual practice this is not always possible, and we find that where large volumes of normal tissue and where important or sensitive organs are unavoidably irradiated also, then the total dose must often be limited to preserve

¹ Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

these tissues, irrespective of the large dose necessary to destroy the tumour. Obviously, it is of little use to destroy the tumour if we at the same time destroy the patient around it.

Here lies the crux of modern therapy—a balancing of beneficial results against possible damaging effects on normal organs or function.

The mere physical achievement of the dose is often easy. We could, for example, possibly destroy carcinoma in the liver; but the necessary irradiation of the liver with such high dosage renders the patient so ill that he prefers death by disease to death by cure.

Intracranial tumours also have been very heavily irradiated of recent years; but here again our technical ability to place the high dose in the tumour has outrun discretion, and though tumours have been destroyed the patient has sometimes been left with paralyses resulting from damage to the brain stem.

Our three secrets of success so far are, then, (i) a radiosensitive tumour, (ii) a uniformly distributed high dosage, (iii) dosage localized to the lesion.

We can thus see how easily these conditions are achieved in a squamous-celled carcinoma of skin, and how hardly in a bladder carcinoma. The bladder carcinoma lies in a busy main street where the traffic cannot be held up; the skin carcinoma lies in an open paddock, where the radiotherapist has relatively little to restrain his ardour.

With deep lesions situated in sensitive areas, such as the bladder, we employ a fourth principle—that is, extension of the treatment over a long period of time. This, in effect, heightens the relative injury upon the neoplasm. To understand why we must go back a little.

Irradiation, contrary to general belief, inflicts the same initial physical injury on normal tissues as on neoplastic tissues. There is no initial selective effect on the neoplasm. The difference is that normal tissues, being physiologically complete, can tolerate a greater insult. The neoplasm being only a caricature of the normal, has less defence mechanism and perishes. This difference can be exploited even with a single dose, sublethal to the normal and lethal to the neoplasm; but the limits here are narrow.

In addition, for the same reasons, normal tissues recover from any single insult more rapidly than the neoplasm, and it is to exploit this more rapid recovery of the normal that we extend the time.

Daily submaximal doses inflict identical physical injuries on both normal and abnormal components, but the smaller recovery of the abnormal each day causes the neoplastic tissue to suffer increased physiological damage. It accumulates damage to a greater and greater degree compared with the normal as time goes on.

Then, at a point entirely empirical and determined only by past experience, when we have reached the limiting safe dose to the normal we cry "halt". Reaction takes place later, the normal tissues recover, but the neoplastic tissue perishes.

This method is almost universally used in all major therapy.

We may now enumerate again our four conditions: (i) a radiosensitive tumour, (ii) a uniform high dosage, (iii) a dose localized as far as possible to the tumour, (iv) a dose extended over a long period.

With all radical treatment, therefore, we aim to include all the tumour, in as small an area as possible, and then carry the dosage to the highest safe level over a long period.

Technical Radiotherapeutic Considerations.

We have now summarized the four main fundamentals and can proceed to our second purpose—the examination of the various radiotherapeutic methods in the light of these principles.

The first of our fundamentals concerned radiosensitivity. Luckily, all carcinomata of the bladder are sensitive to some degree. Papillary lesions respond better than infiltrating lesions, and generally the more cellular and the less differentiated a tumour, the better it will respond.

The rare sarcomata of the bladder almost certainly do not possess any great degree of radiosensitivity.

Radiation methods involve the use of X rays, radium, radon and, of latter years, isotopes—still not freely available in this country.

The biological action of all these is identical in type, though differing in degree, and no one of them has any special inherent virtue in the treatment of neoplasm. It is simply a matter of getting the energy absorbed in the correct areas and at the correct level or depth. We therefore use the tool most suited to the job—or possibly the only one available.

The technical methods used are the following: (i) implantation of radioactive sources in the tumour; (ii) intracavitary methods; (iii) external irradiation.

Implantation of Radioactive Sources.

The most usual method is the implantation of gold radon seeds.

The actual choice of the method should be made at the cystoscopic examination, for it is advisable to insert the seeds at the initial opening of the bladder, when the tissues are lax and the technical problem of correct placement of seeds is relatively easy.

At this cystoscopic examination the urologist should estimate the size and number of the lesions and the diameters of the circles necessary to include them. The method is not suitable when more than a quarter of the bladder is involved or when the number of small lesions is more than four. Lesions which are felt *per rectum* to be palpably thick or which have manifestly passed outside the bladder wall, are not suitable. The urologist passes these numerical data on to the radiotherapist, who can then order his seeds to calculated strength and number, allowing more than seems necessary to provide for any unforeseen eventuality. For radon he will of course need to know the time of the operation, since radon, being a decaying element, has to arrive at the operation table at the calculated strength. Seeds are, of course, inserted obliquely into the mucosa in the calculated positions to cover the calculated areas. Calculations are made according to the data of Paterson and Parker, and the radiotherapist must have these data handy to vary his calculations if the conditions do not accord with the cystoscopic estimation. Dosage is carried as high as 7500r for small lesions.

The usual method is the insertion of planar implants, surrounding the lesion, after all exuberant tissue has been removed by electrosurgery. The seeds remain permanently *in situ* and usually cause no trouble. It should be noted that a planar implant to a given dose only irradiates a slab of tissue one centimetre thick to the estimated dose, and if thicker areas are treated it becomes necessary to put in double planar implants or some form of volume implant. Correct geometrical placement of the seeds then becomes very difficult and, in my opinion, if the lesion is over 1.5 centimetres thick external irradiation is preferable.

The dose in the immediate vicinity of each seed is very much greater than the average calculated dose for the area, and this sometimes causes a local nodular fibrosis which may later on look like a recurrence.

Lastly, stereoscopic X-ray films should be taken after the bladder is closed, to see how correct the placement is.

If at operation it is decided not to implant radon seeds, but to rely upon external irradiation, a seed should be planted in the centre of the tumour for later X-ray localization.

This method (when applicable), in the light of our principles, is ideal. It localizes a high dose fairly into the tumour, and the extension of time is infinite. The results are therefore good, depending upon accurate geometrical grouping of the seeds to correct calculated dosage and the application of the method on the conditions outlined. Radon and radium needles can be used on the same principles; but when the latter are used the bladder must be left open or reopened in seven days for removal of the needles.

For the sake of completeness, radiatized isotope wire has been also used in place of radon needles.

Intracavitary Methods.

Intracavitary methods are those in which a source of radiation such as radium is placed centrally in the cavity of the bladder and allowed to irradiate the walls. The original method was to place a radium capsule in a plug of rubber filling the bladder. This was placed by cystotomy into the bladder cavity, but the results were bad and the method is now practically abandoned.

Variations of the method have been tried by using patent catheters holding a radioactive source at the tip inside a collapsible plastic bag. This apparatus is inserted *per urethram* and the bag is then inflated with fluid, the radioactive source being left in the centre of the distended bag, which now completely fills the bladder. The position of the capsule is checked by X-ray films.

A further recent variation is to omit the radioactive source and inflate the bag with a solution of radioactive cobalt. As the cobalt has a half-life of about five years it can be used repeatedly; but the difficulties of control and protection are obvious. Contamination and spilling constitute grave dangers.

Considered in the light of our principles, these methods have obvious defects. The dosage is not limited to the tumour, but irradiates the whole wall. The dose cannot therefore be carried to such high levels without permanently damaging the wall. Very severe and extensive reactions occur. Owing to the shortness of the distance of the radioactive source from the bladder wall, the penetration is poor and only relatively superficial lesions can be affected. The extension of time is poor, usually a matter of three to four days.

A further variety of intracavitary treatment is the use of X rays, the lesions being treated by means of a cone inserted through the cystotomy opening. Contact machines, such as the Chaoul or Philip's machine, are particularly suited for this method, but superficial machines can be adapted to the purpose. Obviously the method is a one-shot method, and usually a dose of 2000r to 3000r is given to such lesions as can be covered. The difficulty of bringing the X-ray machine to the operating table is considerable, and problems of asepsis arise. Attempts have been made to keep the bladder open and give repeated treatments by this method, but the results were not happy.

External Irradiation.

External irradiation is carried out usually with X-ray machines of varying voltages from 200 kilovolts peak to millions of volts. We unfortunately at present have no megavolt apparatus available. Lately in America Cobalt₆₀ has been used in large quantities owing to its cheapness; it forms a glorified "radium" bomb, producing irradiation of over 1,000,000 volts, and is used in effect like an X-ray apparatus at comparable distances and outputs.

External irradiation is applicable to all forms of bladder carcinomata, too big or too far advanced for implantation or the other methods, though palliation only is likely if the disease has extended through the bladder wall.

The older X-ray methods simply bathed the whole of the pelvis in radiation; but owing to the volume of tissue included and the sensitive organs involved, high dosage could not be achieved, and the results were therefore poor. They cannot be compared with the results of the newer techniques.

The newer method employs small fields converging upon the tumour from many points, so that at the point of convergence there is a volume of tissue irradiated to a high dosage. The problem is to bring this volume of high dosage into exact coincidence with the tumour.

This is achieved by (i) accurate localization of the tumour in position and volume, and (ii) accurate instrumental methods of directing the radiation beam to this volume.

The localization of the tumour rests in part on the information furnished by the urologist, preferably with a dimensional sketch, but mainly on X-ray localization methods. In effect, the information the radiotherapist needs is a vertical projection point on the skin above the

centre of the tumour, the depth below that point and the size of the tumour.

Should a seed have been left in the tumour, the estimation of the vertical projection point and depth localization are easy, as with a foreign body, but previous operation is not advisable, as the presence of a scar on the abdomen limits the possible dose on that area. Usually the tumour may be rendered visible by the introduction of radio-opaque material into the bladder and localization performed as indicated above.

Given the data, it is possible with beam direction apparatus on the X-ray machine, either a protractor or pin and arc device being used, to direct small fields accurately into the lesion from several different angles, and so produce a localized high dose, fairly well limited to the tumour area. The high dose is approximately uniform within the volume of the tumour, as it comes in from many angles. Dosage is carried out on a calculated plan on these fields daily for five to six weeks, with a resulting tumour dose of about 6000r. As each of the fields receives only a fraction of this dose, nowhere else is this high dose reached.

Again we have our last three postulates fulfilled—high uniform dosage, confined to the lesion, and spread over a long period. This radical dose cannot be repeated, as it extends the capacity of normal tissues to the utmost limit of recovery.

The results with good technical achievement of this method have therefore been very good. It is possible that the method has not yet received full use by urologists, owing to the confusion with the older methods, in which the results have been poor. Complications are few. Transient strangury and tenesmus occur commonly during the period of reaction. Infection is a hazard, but not a great one. Painful rectal reactions sometimes occur owing to the proximity of the rectum. Fibrosis of the bladder sometimes occurs as a late result. Palliation in very advanced cases, incapable of cure, can be obtained with much lower doses, and it seems cruel to subject such patients to a heavy course if no hope exists. Tumour doses of about 2500r to 3000r over about two weeks give good relief without increasing distress. Distant metastases are treated on the usual therapeutic lines, and results are mainly palliative. Attention is directed, however, to the great and lasting relief from pain secured in the treatment of bony metastases, even though cure cannot be hoped for.

THE NECESSITY OF METICULOUS TECHNIQUE IN TRANSURETHRAL PROSTATIC RESECTION.

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To attain proficiency in the performance of transurethral prostatic resection is more difficult than to master the technique of any other urological operation. There is probably no surgical procedure in any specialty which is harder to learn than is endoscopic prostatic surgery. The urologist in training must learn much by trial and error. The surgeon who is proficient in the operation can give valuable instruction, but cannot visualize what the student is supposed to see through the resectoscope lens; he can point out errors in technique, and demonstrate the appearance of tissue, but cannot see through the lens while the student is working. The difficulty of orientation, the inability to obtain adequate visualization, the accuracy with which it is necessary to identify tissue, and the meticulous technique required, are all factors which contribute to make transurethral prostatic resection an operation which is difficult to learn and to perform properly.

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

Planned Approach.

The endoscopic prostatic surgeon who performs endoscopic prostatic resection must develop a methodical technique, the steps of which he can follow consecutively. Resecting a piece of tissue here, another there, coagulating a "bleeder" on this side, then hunting for one on the other side, is not conducive to rapid and adequate removal of prostatic tissue. It probably makes little difference what plan is used if it is systematic and is used consistently.

The method which I use and teach consists of removing consecutive pieces of tissue from each prostatic lobe in succession, and deepening rows of pieces from within the urethra outward toward the capsule. When there is an intravesical middle lobe, it is removed first; the loop is placed over the edge of the lobe, a piece is removed, and then the inside end of the resectoscope is moved slightly in a lateral direction to remove the next piece adjacent to the groove made by removal of the first. By repetition of these manoeuvres, a row of pieces is removed from the urethral surface of the middle lobe. Then another row deep to the first is removed and the resection is continued in this way until first the bladder neck fibres, and then the tissue of the prostatic capsule external to the bladder neck are seen. When the middle lobe is small, the bladder neck fibres may appear after the first row of pieces has been removed. After the intravesical middle lobe has been resected, the bleeding is controlled; then the intravesical lateral lobe on one side is attacked; or when there is no intravesical middle lobe, the resection is started on the lateral lobe. The first piece is removed at the 6 o'clock position on the bladder neck, and the next slightly lateral to, above and adjacent to the first, a row of pieces being removed up to the 12 o'clock position as the resectoscope is rotated; then a similar row is removed deep to the first, as the instrument is rotated downward again to the 6 o'clock position. As soon as bladder neck fibres are exposed, the resection is carried no deeper or farther upward into the bladder at that point where bladder neck fibres appear, but is continued outward into the prostatic part of the urethra by the same manoeuvres until prostatic capsule is identified. After the intravesical lateral lobe is removed on one side, the bleeding is controlled in that sector. The next portion to be removed is the intravesical lateral lobe on the same side; consecutive pieces of tissue are removed from the 6 o'clock position to the 12 o'clock position, then back down again to the 6 o'clock position, each row being deep to the previous one. In this way the prostatic part of the urethra is gradually enlarged. The bleeding is controlled in this sector, then the other side of the gland is removed in the same way—first the intravesical lateral sector, then the intraurethral sector.

Evacuation of Pieces.

Evacuation of pieces is accomplished by manipulation of the inner end of the sheath while the bladder is emptied of fluid which runs in during their removal. The inner end of the sheath, from which the working element has been removed, is depressed against the bladder floor, then raised about one centimetre; the outflowing fluid carries the pieces with it. The manoeuvre is repeated several times while the bladder is being emptied.

Orientation.

The surgeon, while he is learning to perform resections, frequently becomes lost in the maze of projecting prostatic tissue and clots, and in the murk of blood-filled fluid through which he attempts to obtain a clear vision. Orientation is accomplished at the beginning of the operation by visualizing and identifying the ureteral orifices and verumontanum. These structures being on the dorsal portion of the bladder and urethra, orientation is enhanced when the resection of rows of pieces is begun at the dorsal or 6 o'clock position near them. After orientation is accomplished, and the resection is started at the 6 o'clock position, the resectoscope must be kept in exactly the same "in-and-out" position while the rows of pieces are removed up to the 12 o'clock position, then down again. If this is done, reorientation is not necessary until removal of the next double row is begun. After the bladder neck

fibres have been exposed, they, instead of the ureteral orifices, are used for identification of the inner boundary of the resected area. The verumontanum should not be removed, for it is used for orientation of the apical portion of the gland throughout the operation. It may be necessary to remove projecting lateral lobe tissue external to the verumontanum, but the resection of the floor is not carried outward beyond this structure. The identification of tissue is a valuable aid in orientation while the resection is in progress.

Identification of Tissue.

The identification of the ureteral orifices, the prostatic border, the encroaching prostatic hypertrophy and the verumontanum is easily accomplished by anyone who is experienced in diagnostic cystoscopy. However, tissue, after it has been cut with the resectoscope loop, is not so easily identified. Prostatic tissue which has been incised with the resectoscope loop is cotton-like and slightly fuzzy in appearance. Bladder neck fibres are usually easily identified; they appear as coarse strands of parallel fibres which are slightly curved, conforming to the contour of the bladder neck. The darker cavity of the bladder can be seen interior and adjacent to them. Prostatic capsule appears as interlacing fibres which are finer than those seen at the bladder neck, and are not so easily identified. As the resection is carried a little deeper into the capsule, the fibres become coarser. Differentiation between prostatic tissue and capsule is important, and can usually be accomplished by placing the interior lens of the resectoscope very close to the tissue and allowing irrigating fluid to run in, the field of vision being kept clear. The false or surgical capsule, which is prostatic tissue compressed by the adenoma, is difficult if not impossible to differentiate from the incised hyperplastic gland. It is somewhat firmer and less cotton-like in appearance, and sometimes after much experience can be differentiated from it.

The recognition of a near perforation and a complete perforation of the capsule is very important. The former is identified by the strands of capsule becoming coarser and more glistening and standing out more distinctly; there is often a small slightly darker area, across which are stretched fine, cobweb-like strands. When complete perforation occurs, there is a black area in the centre of the coarser strands, and if there is very much extravasation, the black area becomes larger and the strands become separated farther apart.

Venous spaces are dark areas which are more circumscribed than the dark area of perforation. Usually the vein wall can be identified, and the strands of tissue surrounding the venous space are not coarse. Frequently a blood clot fills the vein.

One or both ejaculatory ducts are sometimes incised and opened or excised as they course through the dorsal portion of the gland. Their appearance is similar to the vein spaces, but the wall is thicker, and sometimes if infection is present, it is fuzzy in appearance. They stand open and do not collapse as vein spaces do. Frequently seminal fluid is seen to exude from them.

In order to identify tissue, it is necessary to place the inner lens of the resectoscope very close to the tissue being examined, and to run irrigating fluid in to keep the field of vision clear. When the lens is close to the tissue, magnification occurs; prostatic tissue, bladder neck fibres, capsule, and near and complete perforations can be identified. On the other hand, it is impossible to identify tissue when the inside lens is as much as a centimetre or more away from the tissue. Bleeding blood vessels can also usually be identified more easily when the lens is close to them.

Manipulation of the Resectoscope.

It is helpful for the urologist in training to practise manipulation of the resectoscope on a beef heart or in some other manner. He will thus become accustomed to coordinating his movements—the excursion of the loop with the pressure of the foot on the foot switch, movement of the inside end of the instrument against, then away

from the tissue, and manipulation of the inflow of irrigating fluid. The electrical current is applied by depression of the foot switch when the excursion of the loop is begun; the instant the loop enters the sheath, the current is cut off, otherwise the edge of the sheath is burned. As the excursion of the loop is begun, the inner end of the resectoscope is pressed against the tissue to be resected, and as soon as the excursion is completed, it is removed again from the unresected urethral wall; if this is not done, the piece which has just been removed may become impinged against the urethral wall by the end of the resectoscope and obstruct vision by covering the lens. In addition to this movement of the inner end of the resectoscope alternately against, then away from, the urethral wall, the instrument is gradually rotated as successive pieces of tissue are removed from the 6 o'clock to the 12 o'clock position, then back to the 6 o'clock position; during this rotation, the resectoscope is held in exactly the same "in-and-out" position to avoid resecting too far in or too far out. The irrigating fluid inlet is controlled by the first finger of the right hand, either by manipulation of the inlet valve or by kinking the rubber tubing. When clear visualization is desired, the fluid is allowed to run in freely; during the excursion of the loop, visualization is not necessary, and the fluid may be cut off to avoid filling the bladder so rapidly. Frequent emptying of the bladder consumes valuable time. Great care must be exercised to avoid overdistending the bladder. Allowing too much fluid to run in may cause hemorrhagic areas to appear in the bladder mucosa and result in generalized oozing of blood from these areas, predisposing the patient to increased post-operative cystitis. Over-distension of the bladder after the prostate has been removed down to or into the capsule, may cause rupture of the capsule and extravasation through it. It requires considerable practice to coordinate all these movements and to develop a rhythm which is essential to the rapid removal of tissue.

Control of Bleeding.

Even experienced endoscopic surgeons have difficulty in controlling bleeding at times; the novice has trouble with nearly every operation. Allowing the irrigating fluid to run in rapidly helps to keep the field of vision clear and to make bleeding points more visible; increased pressure of the water inflow is a great help at this time, but the surgeon must continually keep in mind the dangers of bladder over-distension. Sometimes an arterial "bleeder" spurts across the prostatic urethra and is deflected back from the opposite side—the blood appears to be originating from the point of deflection; search on the other side may reveal the bleeding point. Bleeding from venous sinuses occurs when there is little or no intravesical pressure, and usually stops when the bladder becomes filled. Electrocoagulation of these sinuses does not control the bleeding from them; it is useless to try to stop venous oozing by fulguration, but a little tension applied to the haemostatic bag at the end of the operation controls it. Observation of the entire prostatic part of the urethra with the Vest straightforward lens sometimes helps the operator to discover bleeding which has previously been obscure.

Irrigating Fluids.

The use of non-haemolytic irrigating fluids has been advocated by some urologists for several years. Acute renal failure following transurethral prostatic resection has been ascribed to intravascular haemolysis from non-isotonic irrigating fluid entering the blood-stream through venous spaces during the operation. Almost without exception acute renal failure has occurred in patients who have had lowered blood pressure, excessive haemorrhage, prolonged operation or extravasation of irrigating fluid at the time of operation. It is therefore very probable that one or more of these factors is partially the cause of acute renal failure in most cases. It is also very probable that the use of a haemolytic irrigating fluid such as distilled or tap water considerably increases the danger of acute renal failure when there is shock from complications during surgery. I had one case in which there were no complications during surgery, but in which acute renal failure developed post-operatively; sterile distilled water was used

during operation, and numerous venous sinuses were opened; there was, however, no excessive bleeding, no drop in blood pressure, no shock and no blood transfusion. The only suspected cause for the acute renal failure in this case was the haemolytic irrigating fluid.

There are a number of isotonic, non-haemolytic fluids which are used. Table I lists these, giving their concentration, advantages and comparative costs in the United States. "Cytal" is prepared by the Cutter Laboratory of Berkeley, California. It is very convenient to use and is as satisfactory as any other solution, but is somewhat more expensive than glycine if the costs of preparing and sterilizing the latter are not taken into consideration. Its contents are as follows: sorbitol 27 grammes, mannitol 5.4 grammes, methylparahydroxy benzoate 0.005 gramme, propylparahydroxy benzoate 0.001 gramme, butylparahydroxy benzoate 0.001 gramme, all per 100 cubic centimetres of distilled water; nine parts of distilled water are added.

TABLE I.
Comparison of Irrigating Fluids for Use in Endoscopic Surgery.

Solution.	Strength of Solution.	Advantages.	Disadvantages.	Cost per 20 Litres (5 Gallons).
Glucose ..	5% (3-6)	Isotonic.	Sticky.	\$3.00 (\$50.00 if intravenous solution used)
Glycine ..	1.9% (1.1-2.1)	Isotonic.	—	\$2.50
Mannitol	3%	Isotonic.	—	\$2.00
Urea ..	1%	Isosmotic.	Not isotonic. Causes haemolysis.	\$1.00
"Cytal" (Cutter)	Dilute 1 to 9 with water (3-2%)	Isotonic. No sterilization required. Easily mixed.	—	\$7.00

The chief disadvantage of any non-haemolytic irrigating fluid is its opacity when mixed with blood; the red cells remain intact and cloud the medium. However, the fluid as it flows inward past the inner resectoscope lens is clear, and visualization is as good with it as with water, when the lens is held close to the tissue and the solution is allowed to run in during orientation and while tissue is being identified. However, it is almost impossible to visualize the interior of the bladder with the right-angle lens, or to view the bladder neck with the retrograde lens when there is any blood mixed with the non-haemolytic fluid.

During the performance of a transurethral prostatic resection, it is safe to use water during the first part of the operation; but as soon as a venous sinus is opened or a near perforation of the capsule occurs, a non-haemolytic solution should be substituted. We have noted a definite decrease in post-operative morbidity since using a non-haemolytic fluid for irrigation during the resection. There have been no cases of acute renal failure in our experience when it has been used.

Summary.

It is difficult to master the technique of transurethral prostatic resection. A planned approach and a methodical execution of the operation are essential. Lack of proper orientation at any time may lead to disastrous results. Tissue as seen through the resectoscope lens must be identified; ability in visualization clearly improves with practice. Manipulation of the resectoscope and the acquisition of rhythm in its use can be learned by practice before one starts to operate on patients. The control of haemorrhage is enhanced by increased water pressure, but over-distension of the bladder is dangerous. Venous bleeding is controlled by the haemostatic bag catheter. The use of a non-haemolytic irrigating fluid decreases post-operative morbidity and helps to prevent acute renal failure.

THE PRESENT STATUS OF TRANSVESICAL PROSTATIC ADENOMECTOMY.¹

By R. J. SILVERTON,
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THIS paper makes a study of the results of 100 consecutive transvesical prostatic adenomectomies performed by me during two and a half of the past three years, nearly half of one year having been spent in travel abroad. A shorter survey is made of all endoscopic resections performed during the same period. The number of the latter was 71.

In recent years many of the prostatic surgery reports from the United States show a great preponderance of endoscopic resections. On the contrary, many of the reports from Great Britain show a preference for retropubic (pre-vesical) adenomectomy. What, then, of suprapubic (trans-vesical) adenomectomy? Is it disappearing, and does it merit disfavour?

I suspect that if a world census was taken among urologists everywhere it might easily turn out that more transvesical adenomectomies are performed at present than any other form of open enucleation.

It would be of great advantage to drop the term prostatectomy unless the prostate gland itself is removed. Adenomectomy may not be a strictly correct term in many instances, or in any for that matter, but it is far less misleading than prostatectomy. Far from removing the prostate in the usual enucleation job, we do a good deal towards restoring the use of that gland to the patient. Therefore the term prostatectomy is just about 200% wrong.

In this paper I cannot draw a direct comparison between transvesical (suprapubic) and prevesical (retropubic) adenomectomy, for I have not embarked on the latter method. I simply analyse the results achieved by the transvesical operation and let them speak for themselves. However, I do draw attention to certain fundamental differences between open enucleation and endoscopic resection, and this matter is of immense practical interest to the general practitioner part of our profession and to patients themselves. Neither the referring practitioner nor the patient is interested in the way in which we perform our open enucleations; all they are concerned with is the result. An immediate good result has a dramatic and compelling effect, but remote results have to be considered too, and this is where endoscopic resection meets its greatest challenge.

The great attraction of open enucleation is the permanence of its good effect in practically all cases, provided of course that the job is done efficiently. Fortunately it is practically impossible for any competent urologist to perform the actual enucleation with other than complete efficiency. Over many years of urological practice I have observed remotely only two types of recurrent obstruction after transvesical adenomectomy: (a) carcinoma developing in the true prostate, usually not until after the lapse of ten to fifteen years, and (b) vesical calculus recurrence, usually associated with infection and the development of a fibrotic ring at the internal meatus.

Late development of carcinoma in the gland itself is rare, and the other complication should be preventable in future if care is taken to eliminate all infection, and, when the stone is alkaline, as it usually is, to keep the patient for some time on the Shorr regimen with "Amphojel".

It will surely be admitted by practically all urologists, even perhaps by the most ardent resectionists, that finger enucleation of what, for want of a better word, we call the adenoma, is a perfectly adequate job. We remove not a whit too much, not a skerrick too little. One is in the true plane of cleavage all the time, and the wall of the resulting cavity is soft, relatively uninjured and bleeding healthily. The important thing is so to improve our management

of adenomectomy that the mortality reaches the low level achieved by skilled resectionists. Only recently (1951) Reed Nesbit admitted freely that this state of affairs had been reached. If that is so, or even nearly so, then to be logical, our indications for resection should be restricted to carcinoma, median bars, the small fibrotic prostate, and affections of the internal sphincter.

With regard to morbidity, early and late, most observers are agreed that this matter is one of the bugbears of resection; the immediate disasters come from doing too much at one point, and the late disappointments from doing too little at various points. In the matter of later regrowth after resection we must not be content with a good result for five or even ten years, but we should feel some definite assurance about what the state of affairs will be in ten to twenty years. Men are living, on an average, ten years or more longer than they did a generation ago, and it is to be deplored if they have to seek vesical relief in the seventies and eighties after undergoing resection during the comparatively youthful decades of the fifties and sixties.

After commencing, rather tentatively, my own work in resection twenty-one years ago, I went through a period of hyperenthusiasm for the method, and gradually reached the state of treating over 90% of obstructions in this way. At some time during that period, Dr. Keith Kirkland gave me his opinion that the younger group of prostatic patients, having a comparatively long expectation of life, should be given the surer benefit of open enucleation, especially as they were practically all "good risks". Blinded by enthusiasm for resection, I did not agree; but for quite a number of years past I have retreated so effectively from my previous attitude that nowadays my proportion of resections to all methods of operation is only about 40%, and I feel sure, from my present analysis, that it should have been somewhat lower still.

I should not like any conclusions reached in the present study to be construed in any way as an attack on endoscopic resection. In highly skilled hands I have little doubt that the method gives lasting results. The trouble is that the degree of skill necessary to secure permanence of benefit is so high that few possess it. Reading between the lines of a mass of reports on resection published in the past ten years gives one the unconquerable impression that the great difficulty of its technique goes hand in hand with associated morbidity and insufficient removal of the tissues that can burgeon again. But, just because of these difficulties, the mass of urologists should imbibe the technical teachings of men like Roger Barnes and Reed Nesbit about method, rhythm and orderliness in their removal of tissue by the loop, and so with systematic care improve their results. Resection is a necessary operation in a restricted range of lesions for any urologist at all, and unless he performs resection in, let us say, from a quarter to a third of all his cases of obstruction, he will not develop sufficient skill.

Indications for Adenomectomy.

Mechanically, I suppose that enucleability is the criterion for adenomectomy. Nevertheless, as will be seen in the final section of this paper, dealing with complications and unusual features, the obstructing mass in three cases was wrongly considered to be normally enucleable, but proved to be so only with difficulty. However, all in this group did well, and a technique for dealing with this condition at open operation is given.

Size is the other important point. The larger the adenoma, the more adenomectomy is called for, provided operative risk does not preclude it. In my opinion, the same rule should apply to medium-sized adenomata too, though ardent resectionists will not agree. With small adenomata there is room for much variance of opinion; if one feels confident that the innocent neoplastic tissue can be fully removed, then resection is the ideal; if not, then adenomectomy is not misplaced even for such small masses in order to avoid very late recurrence in some cases.

Operative risk on any score definitely contraindicates one-stage adenomectomy. The choice is then between two-stage adenomectomy, with a generous interval between

¹ Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

stages, and endoscopic resection. In the removal of smaller growths resection must be given pride of place in all risky cases. In the removal of larger growths, whenever two-stage adenomectomy is considered at all risky, endoscopic resection in two sessions is called for, though I think that here such an intervention should always be carried out transurethtrally—that is, through a bulbous urethrotomy—for this facilitates a difficult operation, which is apt to be somewhat long at each session.

Carcinoma definitely belongs to resection, as do the group of median bars and affections of the internal sphincter, such as fibrosis, hypertrophy and hypertonicity.

Analysis of Age Incidence.

There were 100 cases in which transvesical adenomectomy was performed, and in 71 cases endoscopic resection was carried out.

TABLE I.

Ages (Years).	Adenomectomy.	Resection.
Under 50	0	7
50 to 59	16	9
60 to 69	31	22
70 to 79	43	30
80 to 89	10	8

In both series the highest incidence is in the seventies. In the resection series all the patients aged under fifty years had minor types of obstruction; these cases are briefly described below. In addition to these seven cases there were nine other instances of minor obstruction in men aged over fifty years.

A, aged forty-five years, had a small obstructive fibrotic prostate, associated with prostatitis-vesiculitis. Examination of a biopsy specimen revealed considerable fibrosis with inflammatory changes. This, as well as all the other minor resections, was performed fully, the inside of a sphere being hollowed out, as it were, from bladder to colliculus. An examination ten months later showed that the patient had an excellent urinary stream.

B, aged forty-nine years, had a thin, slow stream of urine; a very obstructive median bar was present. Examination of a biopsy specimen revealed hyperplastic epithelium. A good result was obtained, checked six months later.

C, aged forty-five years, had had hesitation on micturition and a reduced urinary stream for four years. A median bar and an oedematous colliculus were present. The latter was coagulated, and spherical resection of the obstruction was performed. Examination of a biopsy specimen revealed glandular hyperplasia.

D, aged forty-six years, had passed pus and blood in his urine ever since the removal of his left kidney in the country five years earlier. Seven months prior to examination two stones in the bladder had been crushed by a urologist in Sydney. However, the force of the urinary stream remained poor. He had a small bilobed adenoma. Spherical resection was carried out, with a good result. No biopsy was undertaken. The urine was clear nine days after the resection, and an examination after three months showed his condition to be excellent.

E, aged thirty-three years, had had a very restricted urinary stream for some years. He had previously been treated for stricture in Hong-Kong. After dilating a wide type of stricture of the bulbous urethra I found the posterior part of the urethra to be filled with masses of hypertrophied inflammatory tissue. I resected all the tissue fully. Examination of a biopsy specimen revealed fibro-muscular and inflammatory tissue. A few months later I performed an external urethrotomy with intubation for the wide stricture of the bulb. This revealed a very different picture from the urethrogram, which seemed to show a short, narrow stricture in this region. Examinations of the patient up to two years later revealed clear urine and a widely open canal.

F, aged forty-nine years, had had hesitation in starting micturition and stream restriction for six months. His potency was diminished. A thick median bar was found. Resection produced a good immediate result. A letter sent to me two years later declared that the urinary stream was still strong and that potency was normal again. Examination of a biopsy specimen revealed glandular hyperplasia.

G, aged forty-four years, complained of incontinence of urine of several months' duration. This was found to be due

to the "slap" of urine from a moderately distended bladder (chronic retention). I suspected a neurogenic origin and sent the blood for a Wassermann test. Meantime the operating theatre had been booked, so I operated on him and saw fine trabeculation and shallow sacculcation here and there all over the bladder. The internal meatus presented a thin, sharp-looking edge, so I resected the internal sphincter to make the dynamic balance in favour of the detrusor. Meantime the Wassermann test result came back—completely positive. A physician was called in consultation and diagnosed tertiary syphilis of the central nervous system of the disseminated sclerosis type, with exaggerated reflexes and no posterior column affection. The immediate result of the resection was good, and a fortnight later the patient's bladder function was practically normal; he had hardly any residual urine and no escape of urine. He was given a primary intensive course of treatment with crystalline penicillin and iodides, and was sent home to his doctor in the country, with medical instructions from the physician.

There were nine patients aged over fifty years, with minor obstruction, who were treated by resection. Of these, seven had a median bar, sometimes with slight lateral lobe hypertrophy, one had an adenoma on an inter-ureteric bar, and one had a subtrigonal nodule.

Preliminary Drainage in Adenomectomy. Urethral Catheter.

A urethral catheter was used (i) to improve renal efficiency (13 cases) and (ii) to mitigate infection (five cases).

When a urethral catheter was used to improve renal efficiency the duration of drainage varied from seven to twenty-six days. I find the ideal method to be the insertion of a 16F Foley five cubic centimetre catheter, changed only about fortnightly. If this will not pass, I use a very small (size 6 or 7E) red rubber coude catheter, changed daily.

He was aged seventy-eight years. In fourteen days' catheter drainage the blood urea content fell from 56 to 33 milligrammes per 100 cubic centimetres.

When a urethral catheter was used to mitigate infection the catheterization was combined with the administration of a suitable antibiotic. The technique was as described above, except that the red rubber catheter, if used, was left out for two hours at each daily change.

I was aged seventy-seven years. A Foley catheter could not be passed. A medium coude catheter was tolerated badly, so we changed to a size 6E coude catheter, with the technique described above. A very large adenoma was present. Adenomectomy was performed, with vesical closure. The patient did well, except for some pyrexia for six days after the operation.

Perhaps in this case a better method still would have been to use a cystostomy drain as well for the first four days after the operation.

Suprapubic Cystostomy.

A suprapubic cystostomy was established to improve renal efficiency, to remove infection, or both, in 16 cases. The duration of drainage varied from six to twelve weeks. I use a minimum of six weeks' drainage, to allow the full effect of decompression, decongestion and cleansing to be achieved, as well as disappearance of post-operative infiltration in the abdominal wound. At the second stage each layer down to the bladder is dissected up, the fistula is excised, and a small island of bladder is revealed, which, when incised, just allows extraction of the adenoma. Hardly any shock is associated with this part. Now the adenoma is enucleated, and if the edge of the trigone is felt to be undermined, it is stretched and bluntly broken through with the forefinger. Very little bleeding accompanies all these procedures, since the prostatic region has been well decongested. No open, visual operation is performed, hence the speed. A whistle-tip catheter is inserted in the urethra, and the de Pezzer catheter is replaced in the cystostomy for four days only. Usually rapid healing of the fistula follows this technique. Safety is maximal.

J, aged eighty-two years, was suffering from myocardial impairment and auricular fibrillation. He had a massive

adenoma with a coliform infection. Cystostomy drainage was carried out for seven weeks. The patient did well after the second-stage adenomectomy.

K, aged sixty-seven years, had cystostomy drainage for eight weeks to improve his renal efficiency. The blood urea content was reduced from 164 to 33 milligrammes per 100 cubic centimetres. He did well after adenomectomy.

L, aged seventy-three years, had catheter drainage for several weeks without improvement in the results of renal function tests. This was followed by cystostomy drainage for three months. The blood urea content was reduced from 59 to 39 milligrammes per 100 cubic centimetres. He did well after adenomectomy.

M, aged sixty-seven years, had catheter drainage for four weeks, but his blood urea level fell only to 106 from 151 milligrammes per 100 cubic centimetres. He then had cystostomy drainage for eight weeks. His blood urea level is now down to 49 milligrammes per 100 cubic centimetres. Adenomectomy gave a good result, in spite of mild congestive cardiac failure.

N, aged seventy-six years, suffered from retention of urine while in a suburban hospital for cerebral hæmorrhage. Drainage with a small coude catheter was carried out for three weeks. However, this catheter gradually became more and more difficult to pass, and he needed longer preparation on account of his general condition. Cystostomy drainage was carried out for six weeks. He did well after adenomectomy.

O, aged eighty-three years, had undergone an endoscopic resection in the country by a part-time urologist four years earlier. Seven weeks before I examined him a cystostomy had been established for retention of urine. A wide, deep, hard mass of fibrous tissue had to be excised before I could carry out the actual adenomectomy. At the enucleation itself practically no cavity due to an endoscopic resection could be felt. A large collar-shaped adenoma was shelled out and he did well.

Preliminary Drainage in Resection.

Urethral Catheter.

Drainage by a urethral catheter was carried out in 12 cases. The duration of drainage varied from seven days to two months.

P, aged seventy-four years, had had difficulty in micturition and a poor urinary stream for twelve months. A median bar and small laterals were present. The blood urea content was 72 milligrammes per 100 cubic centimetres. Catheter drainage was carried out for eighteen days. The blood urea content fell to 20 milligrammes per 100 cubic centimetres. A good result was obtained from perurethral resection.

Q, aged sixty-six years, had had difficulty and frequency of micturition and scalding for three months. He had recently had acute retention of urine. He developed epididymitis while awaiting admission to hospital, but carried on for two months with an indwelling Foley 16F catheter and antibiotic treatment. Perurethral resection for a small adenoma was then performed, with vas section, and a good result was obtained.

Had this patient been in hospital, I should have established a cystostomy.

Suprapubic Cystostomy.

A suprapubic cystostomy was established in three cases. The duration of drainage was from three weeks to seven months.

R, aged seventy-two years, had a moderately large tri-lobed adenoma. The results of tests of renal function were still poor after nineteen days' catheter drainage, so a cystostomy was established and drainage was continued for three weeks. By this time the adenoma had diminished a good deal in volume, so transurethral resection (perineal resection) was performed. The suprapubic fistula healed rapidly and the patient left hospital twelve days after the resection.

Carcinoma.

There were 19 cases of carcinoma; 16 were confirmed by examination of biopsy specimens of tissue obtained either at resection or by open perineal biopsy. Three cases were diagnosed by a positive response to therapy.

Proved Carcinoma.

S, aged seventy-five years, had suffered from frequency and difficulty of micturition for five years. Examination per rectum disclosed a flat, nodular, fixed prostate. Sub-

capsular orchidectomy and perineal resection were performed. There was good clearance, though the prostatic urethra held the instrument very rigidly, and the ordinary perurethral resection would have been very difficult and traumatizing. Examination of a biopsy specimen revealed adenocarcinoma. A good immediate result was obtained. The post-operative dose of stilbestrol was gradually reduced to one milligramme every other day. The last examination, eight months after operation, showed complete disappearance of the prostate.

T, aged seventy-four years, had undergone orchidectomy and resection by me four years earlier for adenocarcinoma. He was sent back to me because of increasing restriction of the urinary stream. The posterior part of the urethra was found to be very rigid, but perineal resection allowed good clearance. Examination of a biopsy specimen revealed active adenocarcinoma, changing in parts to a scirrhous type. There was no evidence of histological alteration under hormonal influence. I suggested bilateral adrenalectomy, or at least a medical adrenalectomy with cortisone. However, the patient felt well and was satisfied with the mechanical result, so he went home to the country.

U was aged seventy-five years. This is a remarkable case. The patient had a very large, obvious carcinoma. He came to me with retention of urine, and no kind of instrument could be passed, so a cystostomy was established at once. The hard prostatic mass more than half-filled the bladder. Orchidectomy was also performed, and stilbestrol was injected in large doses at first; a small oral dosage was continued after he left hospital. He reported to me monthly after this for five months, at the end of which time I could just pass small instruments *per urethram*. At this time he commenced occasional urination, so later the cystostomy tube was spigoted during the daytime. He urinated better and better, and finally without residual urine. Since the prostate had become much smaller, I decided to perform a perineal resection (the presence of carcinoma had been proved by biopsy) and the suprapubic fistula was *curetted* and suppressed. The latest check, two years after the orchidectomy, showed that the once enormous prostate could hardly be felt. His urination and his general condition are good.

Carcinoma Diagnosed by Response to Therapy.

V, aged seventy-two years, had had a very poor urinary stream for one year. The moderately enlarged prostate felt firm and fixed. Panendoscopic examination revealed a moderately large bilobed obstruction. Bimanual examination under anaesthesia indicated that the prostate was carcinomatous. Subcapsular orchidectomy and perineal resection were performed. Biopsy revealed fibrous and muscular tissue and a few enlarged glands, with no sign of malignant change. However, he did very well, and at a check study twelve months later the prostate gland could not be felt at all.

Had an open perineal biopsy been performed in this case, no doubt the presence of carcinoma would have been proved. The latter is just one example; there were two other cases in the same category.

Carcinoma Suspected but Disproved.

W, aged sixty years, nineteen months previously had undergone endoscopic resection at my hands for removal of obstructing tissue, which proved on biopsy to be simple glandular hyperplasia. Soon after this I suspected tabes, and this was confirmed by a physician, who then treated him fully till he obtained a highly satisfactory serological response. He now returned with recurrence of prostatism, and a rectal examination disclosed what seemed to be a hard, nodular carcinoma. I therefore performed an open perineal biopsy, which showed neither carcinoma nor recognizable prostatic tissue. The tissue was like that of a foreign-body reaction, with giant cell formation, but no tubercles. I then performed a perurethral resection, partly to remove the obstruction, partly to make a further histological check. Tissue taken from all parts proved to be just the same as that from a perineal biopsy specimen, and the pathologist now made the diagnosis of granulomatous prostatitis. This was first described in 1943, and an excellent article appeared in 1953 (Thompson and Albers, 1953). In view of the history, the pathologist thought that the manifestation must be due to tertiary syphilis; but the physician disagreed, since the earlier treatment of the tabes had been so successful. However, he agreed to use iodides. A check palpation three months later showed practically complete disappearance of the prostate, but there were 12 ounces of residual urine, though the stream was good. Probably some remaining detrusor atony explains this. This interesting patient is about due for another check examination.

It is worth noting that granulomatous prostatitis can simulate carcinoma. It is also seen how important open perineal biopsy is if one wishes to achieve full resolution of some difficult prostatic problems.

There were two other cases in this group, and in each instance open perineal biopsy was recruited to disprove the presence of carcinoma.

Technique of Transvesical Adenectomy.

With infection so controllable as it is today, and care about renal efficiency being taken in the preparation of the patient for operation, the chief problem is haemostasis.

Topical control of each artery is the ideal. It would be very convenient if electrocoagulation was more practicable than it is in this situation; but for large "spurters" I have not succeeded in making it trustworthy. Therefore plain catgut haemostatic sutures of some kind are the answer.

The Young boomerang needle-holder and needle are ideal for applying such sutures, but this instrument is rather traumatizing at times. For vessels conveniently situated a small half-circle Mayo needle, held in a long, curved-beak needle holder, is sometimes better.

The important thing is to darken the operating theatre and to use a brightly illuminated vesical retractor to detect the "spurters". These are by no means always in the postero-lateral position, and I have even seen quite large ones spouting from the pubic aspect. It is fortunate for surgeons using the transvesical approach that in most cases the arterial bleeding is from the thick margin of the cavity; bleeding from the cavity itself is mostly venous oozing, which tends to stop later on.

I use the original small Young needle to pass a mattress suture around each "spurter". I find it better to make the point enter from the prostatic cavity on each side of the vessel. The fundus of the loop is on the vesical side and the knot is tied in the cavity, just within the margin. One makes sure by this means of penetrating well under the thick margin, and the puncture is easier through raw tissues than through the tough vesical mucosa.

If there is any trigonal ledge formation, it is removed by wedge resection, which often need only be shallow. As a rule only little vessels bleed from the cut edges of the wedge, and they can be controlled by coagulation or by a small fine needle.

It is of no use putting sutures in fixed or routine situations, as advised by the late Harry Harris, and the less suturing that is done, the better. The pubic half or more of the cavity can be closed by the deeply placed transverse sutures introduced by Harris. I cannot see that this step is essential, however, but it makes the job look neat and helps a little in general haemostasis of the cavity.

The usual drainage is by whistle-tip catheter, about 22F calibre, retained by suture to the suprapubic wound. Should cavity oozing persist to more than a small degree, one may prefer to use a size 22F haemostatic balloon catheter (75 cubic centimetres), with the balloon in the cavity. It should be dilated only to fit the cavity loosely. I really think that if such a catheter is used, it is safer at the same time to avoid primary closure of the bladder and to insert a small de Pezzer cystostomy drain for about four days.

To conclude the operation the bladder wall is sutured completely with interrupted plain gut sutures through all coats, and the organ is allowed to drop down into its anatomical position in the pelvis. Nothing issues through the bladder incision but the silk loop retaining the urethral catheter, which has preferably a terminal and two lateral eyes. Just before the bladder is closed an optimal position of the catheter is verified and marked by catgut tied around the catheter at the external meatus. The prevesical space is drained with a thin tube for three days. Just before the abdominal wall is sutured the watertightness of the bladder closure is tested by distending it with water from my catheter syringe. Any clots are evacuated and about 60 cubic centimetres of water are left in the organ. Just before the patient leaves the operating theatre this procedure is repeated.

Stay in Hospital After Adenectomy.

There were 71 patients who stayed in hospital for two weeks or less after adenectomy. Of the 12 whose stay in hospital was between two and three weeks, nine required reinsertion of a catheter for leakage of urine, one had a coliform infection after a second-stage operation, and two suffered from ileus. Fourteen patients stayed in hospital for more than three weeks; seven required reinsertion of a catheter for leakage, four were detained by slow healing of the wound, one had bedsores, one had mucous colitis, and one had diabetes and secondary haemorrhage.

There were three deaths.

Mortality in Adenectomy.

There were three deaths in the "open" series, a mortality rate of 3%.

X, aged seventy-six years, underwent adenectomy after six months' cystostomy drainage. The blood urea level had been high before, but on his readmission to hospital it was only 36 milligrammes per 100 cubic centimetres. He did well at first after the operation, but on the fourth day became lethargic, with hiccups. The blood urea level then was 82 milligrammes per 100 cubic centimetres. On the ninth day the blood urea level was 105 milligrammes per 100 cubic centimetres. Death occurred on the twelfth day. Autopsy revealed active, long-standing pyelonephritis. Many of the glomeruli were fibrosed.

The question arises whether uraemia would have been avoided by a two-session perineal resection.

Y, aged seventy-one years, underwent adenectomy with excision of a papilloma near the right ureteric orifice. At the end of two weeks the patient was well, urinating and fit for discharge from hospital, except for a short length of unhealed skin. Shortly after this he got a little abdominal pain, but felt well next day. The pain recurred during the next two days, with some distension. A plain X-ray examination revealed small bowel obstruction. A general surgeon examined him in consultation, and decided to operate at once. He found extensive adhesions in the region of the caecum from an old appendectomy, and about this several loops of bowel had undergone torsion and were hyperemic, distended and friable. There was no connexion with the suprapubic wound. Several feet of small bowel were resected, but the patient did not respond and died 24 hours later.

This death was entirely unconnected with the disease or the operation, but might have been prevented by earlier laparotomy.

Z, aged seventy years, did not lose much blood at the adenectomy. Good sutural haemostasis was achieved, and the final vesical wash-out was satisfactory, just before he left the operating theatre.

Several hours later, after he had vomited, blood suddenly poured out of the whistle-tip urethral catheter. The bladder could be irrigated and evacuated with the catheter syringe quite easily. There was no clotting and no distension of the bladder, but the bleeding simply would not stop. When I reached him, his condition was too low to allow any kind of intervention, and he died shortly after that. Then it was discovered by the anaesthetist that the blood transfusion which was started during the second half of the operation was of group A blood, whereas the patient's blood group was O. How the mistake occurred I never discovered.

Dr. R. J. Walsh informs me that there have been one or two other such cases in recent years. The basis of the disaster is fibrinolysis. The treatment is by the repeated intravenous introduction of a solution of fibrinogen or of whole blood. This was an unfortunate accident, unconnected with the disease, but of course connected with the general management of the operation.

Mortality in Resection.

There were two deaths after resection, a mortality rate of 2.8%.

AA, aged sixty years, was being treated in hospital for acute congestive cardiac failure, and developed acute retention of urine. Panendoscopic examination revealed a moderately large trilobed adenoma, with some cystitis. After catheter drainage, rest and the administration of digitalis for five weeks, perurethral resection was performed. The patient's condition deteriorated after this. He developed a temperature pattern characteristic of pyaemia, and later

hemiplegia; death followed. Autopsy revealed multiple septic infarcts in the spleen, kidneys and brain, with acute bacterial endocarditis chiefly affecting the mitral valve, which was distorted by fibrosis.

It is a question whether preliminary cystostomy would have increased the safety of the operation.

BB, aged sixty-seven years, had undergone a perurethral resection by me eleven years earlier. Seven years after that he returned with a short stricture several inches down the penile urethra. I excised this completely and he did well until four years later, when he returned with slight restriction of the urinary stream and some hæmaturia. The stricture excision had been successful and the urethra was fairly well open. Panendoscopic examination revealed some unhealthy, chronically inflamed prostatic projections, with cysts. To avoid trauma to the urethra I performed a perineal resection, which was easy and short. On the fourth day, after he had commenced urination and had been about for two days, embolism of the right leg and right lung base occurred. In spite of careful treatment by a physician, he suffered from repeated lung embolisms and died one month later. Unfortunately no autopsy was obtained.

Complications and Unusual Features.

Vesical Calculi.

There were seven cases of vesical calculi; all calculi were removed at adenomectomy. Great care has to be taken to combat infection after operation, and later one should try also to prevent recurrence of calculus, as the following case shows.

CC, aged seventy-eight years, had had an alkaline stone removed at operation, but infection persisted after he left hospital. It was due to a urea-splitting, Gram-negative bacillus, resistant to all antibiotics and to "Gantrisin". Vitamin A therapy and the Shorr regimen were instituted, with regular doses of "Amphojel". After three months the urine became clear. A reexamination twelve months later showed the urine to be still clear.

Renal and Vesical Calculi.

There was one case in which renal and vesical calculi were present.

DD, aged sixty-nine years, had a *Staphylococcus aureus* infection and three large stones in the bladder. A staghorn calculus was present in the right kidney. The Shorr regimen was instituted afterwards for the alkaline calculi. A good remote result was obtained.

Renal Calculi.

There were two cases of renal calculi, of which the following is an example.

EE, aged fifty-seven years, had had an abdomino-perineal resection one year earlier, and now a small trilobed adenoma was blocking the urinary stream. Transurethral resection was performed. A good result was obtained, but urinary infection remained from the calculus in the left kidney. The stone was alkaline and was removed by pyelolithotomy. The Shorr regimen with "Amphojel" was instituted. One month later the urine was quite clear.

Vesical Diverticulum.

Vesical diverticula were present in six cases. The diverticulum was associated with resection in four cases and with adenomectomy in two cases.

In none of these cases was the diverticulum removed and no trouble was experienced afterwards. In my experience with vesical diverticula a bladder-neck obstruction, usually of the smaller variety, is almost invariably present. Provided this obstruction is completely removed, the diverticulum requires attention in only a very small percentage of cases.

Vesical Papilloma.

Vesical papillomata were present in six cases. Endoscopic resection of the papilloma at the same time as prostatic resection was carried out in two cases, excision of the papilloma together with prostatic adenomectomy was carried out in three cases, and in one case cystostomy was performed first for excision of papillomata and was followed by endoscopic resection.

Vesical Carcinoma.

In one case there was a nodular carcinoma of the bladder complicating endoscopic resection. Deep X-ray therapy was given later.

Recurrence after Resection.

Of five of my own cases recurrence took place after five and ten years respectively in two; adenomectomy was performed. In the remaining three cases recurrence took place after fourteen, sixteen and sixteen years respectively; resection was performed.

There were four cases of recurrence after resection by other urologists; in three of these recurrences took place after six months, seven months and eight years respectively, and a fresh resection was performed. In the remaining case the recurrence took place after two years, and adenomectomy was necessary.

Recurrence after Transvesical Adenomectomy Performed Elsewhere.

There was one case in which a unilateral large adenomatous mass remained after transvesical adenomectomy performed by a general practitioner. Resection was performed.

Cystitis Complicating Resection.

In one case cystitis complicated resection, and later sclerosis of the internal meatus developed. The establishment of a preliminary cystostomy would have been better management. This was advised later, but the patient refused.

Epididymitis before Operation.

In one case epididymitis occurred before operation. After a primary delay in order to give antibiotics, vas section and transurethral resection (perineal resection) were performed.

Epididymitis after Operation.

Epididymitis after operation did not occur in any case in either series. Vas section is performed as a routine before adenomectomy, but omitted in all cases of resection.

Deep Perineal Drainage.

Deep perineal drainage was carried out after adenomectomy in four cases because of a narrow urethra, an intolerant urethra or the presence of a previous stricture. The drain by-passes the urethra by perforating the left wall of the prostatic cavity, and issues through the left ischio-rectal fossa.

Total Transvesical Prostatectomy.

There was one case in which total transvesical prostatectomy was performed accidentally by a general practitioner, in place of an intended ordinary adenomectomy. The result was stenosis of the internal meatus and of most of the prostatic urethra. A vesical calculus was also present. Cystostomy was performed, with removal of the calculus. The internal meatus was absolutely rigid. It was dilated forcibly with a strong nephrectomy clamp, then dilated with the largest curved sounds and finally with the forefinger. This applied to the prostatic urethra also. Drainage was established through the urethra and the wound was closed. Antibiotics and then the Shorr regimen with "Amphojel" and vitamin A were administered for a long period.

Fibrotic Neoplasm Met at Adenomectomy.

In three cases, at the transvesical operation, surprise was experienced at meeting a firm, small, nodular mass, instead of the expected elastic, enucleable adenoma. The rigid internal meatus was dilated in the manner described in the previous section. This allowed the right forefinger to penetrate well into the prostatic urethra and to enucleate the small, nodular lobes with difficulty. After this the cavity formed was quite a roomy, spherical space, with soft walls, and all patients did well. There was very little bleeding in any case, and vesical closure was primary. Biopsy in all cases disclosed some combination of fibrosis, muscle tissue and glandular elements, occasionally with chronic inflammatory changes.

Stricture of Fossa Navicularis.

Stricture of the *fossa navicularis* occurred in one case after perurethral resection. This incidence is low because after the initial portion of the period under review I have performed all resections except minor ones through a bulbous urethrotomy—that is, by the transurethral route.

Stricture of the *fossa navicularis* occurred in two cases after adenomectomy. These were both due to a urethral catheter which was a little too large for the particular patient. This trouble can be avoided by keeping the size of the catheter down, by performing a generous navicularotomy, but, better still, by instituting deep or superficial perineal drainage (ischio-rectal fossa or bulbous urethra).

Stricture of the Urethra Itself.

No case of stricture of the urethra followed either adenomectomy or resection.

Adenoma Complicated by Urethral Stricture.

Adenoma was complicated by urethral stricture in one case, in which a small medial adenoma was complicated by the presence of a stricture of the bulbous urethra of the long, relatively wide variety. I combined a transurethral resection (perineal resection) with external urethrotomy and instituted drainage with a "Latex" catheter for a fortnight.

Bedsore with Dehiscence of the Wound.

Bedsore with dehiscence of the wound occurred in one case. The patient was delayed in hospital for three months, but was otherwise well.

Secondary Haemorrhage after Adenomectomy.

In 11 cases secondary haemorrhage occurred after adenomectomy. This may seem a high incidence, but I include all the cases in which the patient was taken to the operating theatre, and I introduced the number 24F resectoscope, evacuated clots, sealed bleeding points, if any, and put in a number 22F Foley haemostatic balloon catheter. I did this without delay whenever clots prevented catheter drainage and a suprapubic swelling was present. Only in one case had this procedure to be repeated, and in no case did a fatality occur.

Recent Congestive Cardiac Failure.

There were two cases in which recent congestive cardiac failure had occurred. Transurethral resection was performed in both.

Severe Hypertension.

In three cases the patients were suffering from severe hypertension. Transurethral resection was performed in all.

Arteriosclerosis and Hypertension.

One patient, aged eighty-six years, was suffering from arteriosclerosis and hypertension. Transurethral resection was performed in two sessions. The patient did very well.

Arteriosclerosis and Pernicious Anæmia.

In one case arteriosclerosis and pernicious anæmia were present, and perurethral resection was performed for carcinoma of the prostate.

Duodenal Ulcer and Bronchitis.

One patient was suffering from duodenal ulcer and bronchitis. Transurethral resection was performed.

Mucous Colitis.

In one case mucous colitis developed on the third day after adenomectomy. The patient did well with medical treatment.

Recent Cerebral Haemorrhage.

Two patients, aged seventy-six and eighty years respectively, had recently had a cerebral haemorrhage. Both underwent adenomectomy. The first operation was a one-stage adenomectomy, and the second was performed in two stages, with six weeks between the stages. Both patients did well.

Ileus after Adenomectomy.

Ileus after adenomectomy occurred in two cases.

The first patient, aged fifty-eight years, had furious bleeding during enucleation, but fair hæmostasis was obtained. The same evening it was impossible to get the catheter to run, and I regretted not putting in a cystostomy drain. I repaired this error at once, and found with surprise that there were no clots in the bladder, but the latter was contracted tightly down on the catheter. The next day the patient developed severe ileus. All food and fluids were withheld, glucose was given intravenously, and gastric suction was instituted. One litre of Darrow's solution was given every two days to make up for the loss of potassium. The patient took one week to get well.

The second patient, aged sixty-four years, did well except for moderately severe bleeding. Ileus commenced on the third day. Treatment as in the preceding case was given, but the patient recovered in four days.

Diabetes.

There were four patients with diabetes, all well controlled by medical treatment. Two resections and two adenomectomies were performed.

Resection Preferred Because of Risk.

Resection was preferred in cases in which the adenoma was large and adenomectomy was definitely indicated, but was avoided on account of the medical risk.

It is often difficult to decide whether it would be safer to do this or to establish a preliminary cystostomy and perform enucleation rapidly much later, if and when the patient's general condition improved.

There were four patients in this section, and had they been treated by one-stage adenomectomy, all or some might have died, so it may be claimed with some justice that one's adenomectomy statistics can be kept healthy by transferring "high risks" to the resection group.

FF, aged sixty-five years, had experienced myocardial infarction. I performed transurethral resection in one session and the patient did well.

GG, aged eighty-two years, was very senile and extremely frail. I performed transurethral resection in two sessions and he did well.

HH, aged seventy-one years, had had a recent coronary occlusion and bronchopneumonia. I performed transurethral resection in two sessions and he did well.

II, aged seventy-five years, had suffered from attacks of heart block. However, after treatment the physician passed him for open operation. I would not risk this and performed transurethral resection in two sessions. He nearly died of heart block after each session, but finally did well.

Incontinence of Urine.

Incontinence of urine was not seen in the adenomectomy series, except ephemerally in a few cases. Two patients in the resection series had incontinence of urine under stress only, when up and about.

Osteitis Pubis.

In thirty-three years of urological practice I have not seen *osteitis pubis*.

Comparative Statistics.

So as to be able to make some comparison between the results of retropubic (prevesical) adenomectomy and the transvesical operation, I have taken the paper published by Arthur Jacobs, of Glasgow, in 1951. This author is one of the most highly skilled urologists in Britain, and his paper covers the very large number of 500 retropubic adenomectomies. His mortality rate was 6% over the whole of this series—larger at first, and less towards the end of the series. Morbidity was concerned at first, like Millin's experience, with bladder-neck obstruction, later conquered by excising a wedge from the trigone. Jacobs had only a 0.6% incidence of *osteitis pubis*, which is far lower than that encountered by many other urologists throughout the world. He is a gentle and skilful technician, and apparently that has a good deal to do with the avoidance of this serious complication.

In regard to the proportion of resections to his total of all bladder-neck obstruction operations, Jacobs's percentage was just under 20. I have gradually retreated from operating on over 90% of all obstructions by the endoscopic route to a percentage of about 40.

Conclusions.

I have gained the impression, from the analytical study made for this paper, that transvesical prostatic adenomectomy can hold at least equal status with retropubic (prevesical) adenomectomy as regards mortality, and is apparently associated with a somewhat lower degree of serious morbidity.

I have also gained the impression that the two-stage operation—that is, with preliminary suprapubic cystostomy—could be used more frequently than it is in the more dangerous and difficult groups of cases, both for open adenomectomy and for endoscopic resection.

The operation of endoscopic resection is of the greatest importance, and it is essential for every urologist to become competent in this most difficult art. The special value of resection lies in its application to the carcinoma, fibrotic prostate and sphincter affection groups, and for these it is generally considered the operation of choice. For all groups of enucleable adenomata, except the very smallest growths, the average urologist will be well advised to perform open enucleation except in cases of high risk. In this series it was found advisable to transfer only 4% of patients from the open to the resection operation to avoid risk. In all other cases, if permanency of effect is required, it is more likely to be secured by open adenomectomy, unless the resectionist is one of the very rare people who possess unusual skill in this art.

The operation of perineal adenomectomy has not been mentioned, for in common with nearly all urologists in British schools, and apparently with most urologists in the United States, fear of associated morbidity has kept me from performing this operation.

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THE PATHOGENESIS OF ACUTE RENAL FAILURE.¹

By C. R. B. BLACKBURN,²
 Sydney.

ACUTE RENAL FAILURE is usually defined as the clinical syndrome resulting from the rapid but temporary loss of renal excretory function due to alterations in tubular function. It is caused by ischaemia and toxic damage, and is characterized pathologically by the development of disseminated areas of renal tubular degeneration. Anuria from ureteral blockage and renal infarction are not included.

This definition describes a particular clinical syndrome, but it is important to realize that there is a continuous spectrum of disorders characterized by acute loss of renal tubular function with profound oliguria or anuria. Patients with the mildest forms have a transient and usually unrecognized disorder, whilst those with the severest forms die. The classical form of acute renal failure has often been referred to as "lower nephron nephrosis" (Lucké, 1946); but this term has many objections, not the least of which is its pathological inaccuracy.

¹ Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

² From the Clinical Research Unit, Royal Prince Alfred Hospital, Sydney (supported in part by the National Health and Medical Research Council).

My purpose, in this symposium, is to provide a background for the succeeding speakers and to discuss the more important aspects of the pathogenesis of acute renal failure.

The Clinical Course of Acute Renal Failure.

In mild cases the initiating episode leads to oliguria or even anuria which lasts a few hours or less, and complete recovery quickly takes place without patent renal failure (Figure I).

In typical cases, however, transient oliguria progresses to anuria so rapidly that the gradation is unnoticed. Anuria lasts for one to twelve days or even longer, and is usually followed by a pronounced diuresis. Some weeks or months later renal function returns towards or to normal, but in a clinical sense the patient is cured in a short time.

There are four main causes of death in this group of patients: (i) the cause of the acute renal failure—that is, the initiating episode and any preceding renal functional

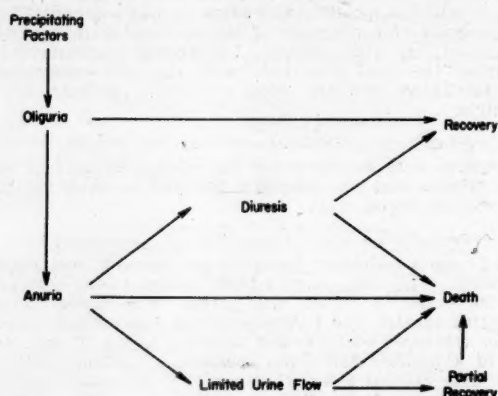


FIGURE I.

The clinical courses of patients with acute renal failure.

impairment; (ii) biochemical maladjustment in the anuric and diuretic phases; (iii) the treatment given; (iv) infection.

Inadequate or over-zealous treatment during the oliguric or diuretic phases may result in gross chemical maladjustment. Acidosis and hyperkalemia are not uncommon in the anuric phase, but overhydration with oedema, from treatment, is commoner than dehydration. Dehydration and hypokalaemia may be difficult to avoid in the diuretic phase.

The mortality in a series of patients with typical acute renal failure should be low, since death from biochemical causes, whether primary or induced, and the infection which often results from therapy are both preventable.

In the severest cases anuria is not followed by a return of urine flow, though occasionally there may be a gradual return without a real diuresis. In the latter circumstance, partial recovery may take place and the patient be left with considerable renal insufficiency, which will cause death some time later.

The Pathological Course of Acute Renal Failure.

In the mildest cases transient oliguria, or anuria, is a reflection of altered renal tubular function without significant tubular epithelial degeneration, and there is a complete return to normal function. I am sure this condition is relatively common in patients with shock of all degrees, but it passes unnoticed (Figure II).

When the initiating episode is more damaging there are loss of function, cessation of urine flow and degeneration and necrosis of the tubular epithelium. The lumina become blocked by swelling of the lining cells, by compression from interstitial oedema and by pigment or debris casts, and there is loss of continuity of the tubular walls—

tubulorrhesis. After some eight to twelve days epithelial regeneration is usually more or less complete in some tubules, the debris is removed from the lumina which are patent again, and urine flow is reestablished.

A diuresis occurs because some tubules are patent, but their function is still so far from normal that the urine consists of glomerular filtrate little altered in its passage through the tubules. A diuresis of four to ten litres a day does not necessarily represent much return of function, since normal glomerular filtration is about 180 litres a day and tubular resorption a little over 178 litres. Normal tubule function may not return for three to six months or more, if ever.

Bilateral cortical necrosis of the kidneys represents the severest type of injury to the kidney in this spectrum of diseases, since it causes severe glomerular and tubular damage; indeed, a portion of the loops of Henle may be the only parts of the cortical nephrons that are spared. Death usually occurs from renal failure; but some patients with cortical necrosis recover, to be left with chronic renal insufficiency, and this recovery depends greatly upon the management of the patient and the extent of the lesion.

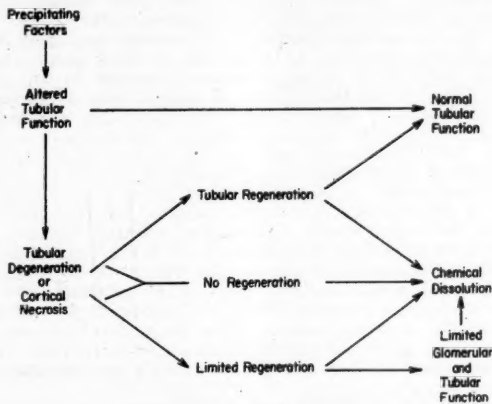


FIGURE II.

Pathological courses of patients with acute renal failure.

The Precipitating Factors.

The precipitating factors may be grouped under the following two headings: (a) toxic—that is, those substances especially causing toxic changes in the tubules, nephrotoxic damage; (b) ischaemic—that is, vascular alterations causing secondary changes in the tubules, and especially the ischaemic episode of Jean Oliver (1951).

Oliver demonstrated that nephrotoxic changes are diffuse, are especially pronounced in the whole proximal convoluted, consist of acute epithelial degeneration and occur especially after the exhibition of mercury, uranium, sulphonamides and carbon tetrachloride. He also showed that pure lesions of the proximal convoluted tubules practically never occur, because most toxic substances also induce patchy ischaemic lesions. The ischaemic episode leads to similar nephrotoxic changes in some proximal convolutions, but more characteristically it causes localized areas of tubulorrhesis scattered throughout the proximal and distal convoluted tubules. These lesions consist of areas in which there is not only loss of tubular epithelium, but also damage to the tubule wall, nearby interstitial tissue and veins which may be thrombosed. Any return of function in these tubules must be slow, for the sub-epithelial and interstitial damage will be repaired more slowly than simple epithelial degeneration. It is probable that some nephrons are always lost in tubulorrhetic lesions, which typically occur in shock and after crushing injuries. It must be stressed that both types of lesion occur in most patients with acute renal failure, whatever the cause.

The majority of patients developing acute renal failure do so on a multifactorial basis, for there are vascular factors even in the apparently purely toxic cases. The girl who has taken corrosive sublimate or the man who has taken anti-freeze fluid (diethylene glycol) both have shock and dehydration, and renal function studies would show severe renal vasoconstriction. *Clostridium welchii* infections are associated with severe systemic effects as well as with local toxic effects on the renal tubules—for example, hypotension, fever and intravascular haemolysis.

Intravascular Haemolysis.

Intravascular haemolysis is one of the best recognized precipitating factors of acute renal failure, and common causes of it are transfusion of mismatched blood, *Cl. welchii* infections and blackwater fever; in the past it was apt to follow transurethral resection of the prostate when distilled water was used for lavage. There are usually additional factors operating in patients who develop intravascular haemolysis—for example, the reaction from antigen-antibody combination in transfusion of mismatched blood, the severe systemic effects of falciparum malaria causing blackwater fever, and the post-operative shock and preceding renal dysfunction in the elderly man undergoing prostatic resection.

The first renal response to intravascular haemolysis appears to be vascular rather than toxic, and haemoglobin *per se* seems to be relatively harmless to the normal kidney unless it is in very high concentration in the plasma. Pigment casts in the renal tubule seem to be caused by the failure of resorption of filtered haemoglobin and myoglobin in the proximal convolution of the renal tubule, as a result of anoxia, and their subsequent precipitation more distally after pronounced water resorption and a fall in urine pH.

The statistics on haemoglobinuria in the Australian army in New Guinea and nearby islands in the 1939-1945 war provide an excellent clinical example of the relative harmlessness of haemoglobin on the human kidney. Haemoglobinuria was recorded on 41 occasions in association with malaria and its treatment in 35 soldiers. Only one of these men died as the result of acute renal failure, though modern treatment was not available to most of them for obvious reasons.

Renal Vasoconstriction.

Reflex renal vasoconstriction and ischaemia are most important factors, especially in the patient suffering from shock. Renal vasoconstriction and anuria after crushing injuries need little stressing, but a mild degree of hypotension may induce pronounced renal changes in the older patient with damaged kidneys or in the woman with toxæmia of pregnancy.

Renal vasoconstriction alone can cause all the stages of acute renal failure set out in the first schema. The mildest disorder, characterized by transient oliguria, has been studied in this Clinical Research Unit during the past three years (Blackburn *et alii*, 1954). We observed the changes in renal function in patients with induced intravascular haemolysis and found that one of the earliest measurable changes was a decline in renal blood flow accompanied by a significantly correlated decline in urine flow. The development of pronounced oliguria was common, but anuria was exceptional and always transient. When the haemolysing infusion was stopped, renal blood flow promptly returned to or towards normal, and no residual changes were apparent. In these patients the vascular changes appeared to induce or to be induced *pari passu* with a functional oliguria and anuria; there was no evidence of tubulorrhesis or other structural renal change. There was no evidence of systemic vasoconstriction or shock during these studies, as evidenced by change in arterial blood pressure or tachycardia. It seemed reasonable to suppose that these functional changes might be replaced by structural changes if renal vasoconstriction was allowed to persist or to become maximal.

When more moderate ischaemia occurs—for example, from a hypotensive episode during operation—then the classical anuria-diuresis-recovery sequence is induced.

If there is really severe renal vasoconstriction there may be bilateral cortical necrosis of the kidneys, which is most commonly seen in patients with nephritis or eclampsia and accidental haemorrhage.

Franklin (1952) described the "utero-renal reflex". He found that acute distension of the rabbit uterus induced immediate intense renal vasoconstriction so that the kidneys became blanched; there was cortical ischaemia of the Trueta type. These rabbits showed no evidence of shock or of systemic cardio-vascular changes. Franklin was also able to demonstrate a similar reflex by acutely over-distending other hollow viscera—for example, the small intestine. It has been suggested that such a reflex plays a role in the human and especially in pregnancy, when acute renal failure and even bilateral cortical necrosis of the kidneys may occur.

The group of patients with acute renal failure associated with pregnancy is of considerable interest and forms a significant proportion of any series of cases occurring in a general hospital. Certain aspects of some of these patients have been reported recently by Hunter and Reed (1953), and the whole subject is discussed in detail by Sophian (1953) in his recent book. Dr. J. Farrar kindly made available to me the records of all the oliguric and anuric patients treated in King George V Hospital between 1943 and 1953. Of the ten patients suitable for consideration, one had sulphonamide anuria, two had very severe post-partum haemorrhages and shock without other demonstrable disorder, and one had transient oliguria during labour only. All the other six had toxæmia of some degree, and five were shocked, but not more severely than some other patients who did not develop oliguria or anuria. Three patients died, and the only one about whom a full autopsy report is available had bilateral cortical necrosis of the kidneys and an accidental haemorrhage. Accidental haemorrhage occurred in four of the last-mentioned six patients, and a fifth had tonic contraction of the uterus. The patients' illnesses appear to lend support to the occurrence of a utero-renal reflex induced by acute uterine distension in the human, as described by Franklin in the rabbit.

We have recently had a patient in our care in whose case a clinical diagnosis of bilateral cortical necrosis was made, and though she has recovered she now has very pronounced impairment of renal function. Her illness followed a severe accidental haemorrhage at term, but she had little or no shock at the time; the initiating cause for her acute reflex renal vasoconstriction was considered to be accidental haemorrhage.

Accidental haemorrhage and shock are the characteristic precipitating factors of acute renal failure in pregnancy, and accidental haemorrhage appears to be of dire significance, though accompanying shock may not be severe. There is good reason to believe that in some patients accidental haemorrhage induces such severe renal vasoconstriction that bilateral cortical necrosis results.

It seems reasonable to suggest that this reflex may be responsible for the anuria that occasionally follows simple manoeuvres *per urethram*, for calculus anuria when there is not a complete obstruction to urine flow, and for anuria following trauma to one kidney. The latter type of lesion is exemplified by a patient, recently discharged from this hospital, who sustained trauma to his right loin with little shock, but had haematuria and developed classical acute renal failure. It was postulated that severe renal vasoconstriction resulted either from direct renal-renal reflex or from a pelvi-renal reflex stimulated by sudden acute dilatation of the renal pelvis with blood.

The precipitating factors of acute renal failure, then, are (i) toxic, affecting especially the proximal convoluted tubules, and (ii) ischaemic, inducing patchy tubulorrhexis. Renal vasoconstriction is present in practically all cases of acute renal failure, and occurs as the result of hypotension, shock, intravascular haemolysis and toxic damage, and as a reflex. Most patients develop acute renal failure as the result of the summation of several factors, unless a single precipitating factor is overwhelmingly in its intensity.

The Predisposing Factors.

The principal predisposing factors to acute renal failure are as follows:

1. Impaired renal function and especially acute glomerulonephritis, chronic glomerulonephritis and nephrosclerosis. Apart from accidental haemorrhage acute glomerulonephritis is the only common condition in which bilateral cortical necrosis of the kidneys occurs.
2. Pregnancy, and especially toxæmia of pregnancy. These are most important in predisposing the subject to acute renal failure—indeed, Sophian considers that toxæmia of pregnancy is caused by renal vasoconstriction.
3. Old age.
4. Any factors predisposing the subject to shock.

The presence of these predisposing factors should alert the physician, surgeon or obstetrician to the possibility of acute renal failure, particularly if any circumstances associated with shock are anticipated.

Therapeutic Implications.

The therapeutic implications of these remarks are three in number.

First, any efforts to reverse acute renal failure from renal vasoconstriction must be directed to the rapid production of renal hyperaemia, for it cannot be hoped that vasodilators administered a day or so after acute renal failure will be of value. Measures directed to this end have included the intravenous administration of procaine, phenol or alcohol block of the sympathetic chains, and the use of sympathetic blocking agents. Their value is far from established, and few employ them as a routine measure at the present time. We have been able to induce renal hyperaemia in the early stages of renal vasoconstriction by the injection of a foreign protein; but this measure cannot be recommended without due warning, because we have seen a patient, recovering from acute renal failure, develop profound oliguria as the result of a pyogenic reaction following an intravenous saline infusion.

Secondly, the patient must be supported during the anuric and diuretic phases, since the natural history of acute renal failure is one of anuria-diuresis-recovery. The patient must be kept alive long enough for his kidneys to recover.

Thirdly, efforts should be made to assist tubular regeneration rather than to hinder it. There is little point in adding to the burden of the kidneys by injecting salts like sodium sulphate, or by handling the kidney and removing its capsule, which may induce shock and further accentuate the lesion. The only rational time to decapsulate or split the kidney would be early, so that the tissue tension might be lowered.

Summary.

Acute renal failure is a clinical syndrome occupying a central place in a continuous spectrum of disorders of renal function characterized by acute oliguria and anuria. Renal vasoconstriction is the most important single factor in its causation, though nephrotoxins often play a major role. Treatment intended to reverse renal vasoconstriction and so prevent tubular degeneration must be used within the first hours of the onset, and subsequent treatment is essentially supportive.

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BLOOD TRANSFUSIONS AND ACUTE RENAL FAILURE.¹

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CONSIDERATION must be given to the role of blood transfusions in any discussion of acute renal failure, because they may be important both as causative and as therapeutic agents. No attempt will be made in this paper to explain the mechanism by which a renal lesion is sometimes produced by blood transfusions. Intravascular destruction of red cells is, however, always a prominent feature, and it seems desirable to review very briefly the manner in which red cells, both normal and abnormal, may be removed from the circulation.

The Mechanism of Red Cell Destruction.

At present there is no exact knowledge of how red cells are removed from the circulation at the end of their life-span of 100 to 120 days. Many theories have been advanced, but those most favoured are as follows: (i) phagocytosis by the macrophages of the reticulo-endothelial system; (ii) fragmentation by buffeting in the circulation; (iii) stasis, with possible enzymatic changes in the splenic sinusoids. Under normal circumstances, red cell destruction, whatever the mechanism may be, is an orderly process. Only the aged cells, presumably altered in some undefined chemical manner, are removed, and the process proceeds at a constant rate, varying little from day to day or at different times of the day. The rate of replacement always equals the rate of removal, and a state of equilibrium results.

Some features of the physiological process of extravascular destruction are illustrated in Figure I. This

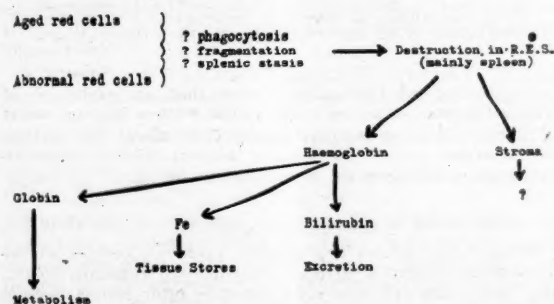


FIGURE I.
Extravascular hemolysis.

mechanism also removes many abnormal red cells from the circulation before they reach the senility of three or four months. This premature removal occurs when the cells contain haemoglobin of unusual chemistry, such as sickle cell haemoglobin or haemoglobin C, and, at least to some extent, when the surface of the cells is altered by chemical agents or by antibodies.

It is possible that the spleen may not be the organ for destruction of aged or abnormal red cells; but the reticulo-endothelial cells contained in it are almost certainly the receptors for such effete cells. The haemoglobin and the residual particulate material—the stroma—are first separated, each to undergo its separate catabolism. The fate of the stroma is not known, but the chemical material must be either used again or excreted from the body after

ingestion by the macrophages. The fate of the haemoglobin molecule has been more carefully studied. It is ultimately split into (i) the globin component, which is metabolized as part of the general protein metabolism of the body, (ii) the iron, which is first passed to the tissue stores and then used again for haemoglobin synthesis, and (iii) the protoporphyrin component, which is converted into bilirubin and secreted in the bile. Only minimal amounts of iron are excreted, and these probably in the form of cellular debris.

Extravascular destruction of red cells does not produce haemoglobinemia and therefore does not cause kidney damage. Excessive production of bilirubin, which cannot be easily excreted, results in an increase in the concentration of bilirubin in the serum and in jaundice.

In certain pathological conditions, including incompatible blood transfusion, red cells may also be removed from the circulation by the process of intravascular hemolysis. This occurs when chemical agents or immune antibodies against red-cell antigens are present in the blood, or when red cells are so damaged by external factors that they are unable to survive in the circulation and liberate their contents into the plasma. The sequence of events in intravascular hemolysis is shown in Figure II. Haemoglobin

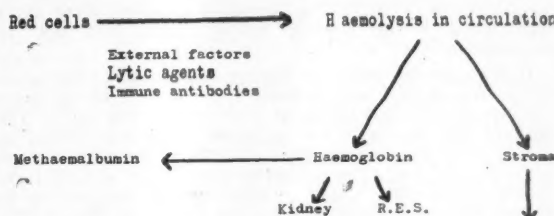


FIGURE II.
Intravascular lysis.

liberated into the plasma passes to the reticulo-endothelial cells and to the kidney. In the kidney some of the haemoglobin escapes through the glomeruli, to be absorbed by cells of the proximal convoluted tubules. Haemoglobinuria is produced when the absorptive capacity of the cells is exceeded.

Methaemalbumin is formed in the blood-stream some hours after liberation of haemoglobin, and its presence is indisputable evidence that intravascular hemolysis has occurred. Haemoglobinemia is the first sign of such an accident; but special care to prevent red cell damage must always be taken when venous blood is collected and tested for the presence of haemoglobin in the plasma. Haemoglobinuria may be transient and minimal in amount, requiring spectroscopic analysis.

Red Cell Destruction in Incompatible Transfusions.

When red cells incompatible with the recipient's serum are administered, they are sooner or later removed from the circulation. In most incompatible blood transfusions extravascular destruction predominates and jaundice is the prominent symptom. However, intravascular hemolysis is a usual but not invariable accompaniment, and leads to impairment of the renal function. This latter mechanism is thought to occur when immune antibodies associated with hemolysins are present in the recipient's or donor's serum. In their absence the red cells coated with antibody are removed by extravascular destruction.

Transfusions incompatible on the ABO groups may occur in patients who have no immune anti-A or anti-B antibodies, and these are associated with pronounced jaundice but little if any impairment of renal function. Nevertheless, many factors, such as pregnancy, vaccination and injection of serum, lead to the development of immune antibodies against A and B antigens, and consequently

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

most such incompatible transfusions are associated with intravascular hemolysis. Other immune agglutinins, such as those against antigens of the Rh and MNS blood group systems, produce intravascular hemolysis *in vivo*, although they are not associated with hemolysins demonstrable *in vitro*.

The rate of hemolysis after incompatible transfusion, as well as the relative proportion of intravascular hemolysis and extravascular destruction of the red cells, presumably depends on the concentration of the responsible hemolysin and on the amount of complement available for the reaction. Moreover, the fate of the hemoglobin is determined by the rate of red cell hemolysis. If it is rapid, a large amount of hemoglobin may be excreted in the urine before anuria occurs. On the other hand, if hemolysis is slow, anuria may occur without easily detectable hemoglobinuria.

The Causes of Renal Failure After Transfusion.

It cannot be stressed too strongly that acute renal failure after blood transfusion is a medical or surgical disaster. The accidents are nearly always the result of human carelessness in handling a curative form of therapy and frequently occur when insufficient consideration is given to the indications for transfusion. It has been said that at least in some countries the mortality directly due to blood transfusion is at present greater than that due to appendicitis.

Destruction of red cells during storage or immediately before transfusion may produce renal failure in the same way as the administration of incompatible red cells. The reasons for such red cell destruction must therefore be included in any list of the causes of acute renal failure after transfusion. The following transfusion accidents are not necessarily in order of frequency or importance as causes of acute renal failure: (i) technical and clerical errors in cross-matching tests; (ii) blood group immunization not detected by the cross-matching test used; (iii) administration of incorrect blood, due to insufficient or inaccurate labelling of bottles or lack of checking; (iv) confusion between patients; (v) use of group O blood for patients other than those of group O; (vi) use of over-aged blood; (vii) use of overheated or frozen blood; (viii) infection of blood with hemolytic microorganisms.

Blood Transfusions in the Therapy of Acute Renal Failure.

There are three ways in which blood transfusions may be of value in the therapy of acute renal failure: (i) to remove red cells still in the circulation after incompatible transfusion; (ii) to correct anaemia or oligæmia, whichever was the original indication for transfusion; and (iii) to remove potassium or the accumulated end-products of protein metabolism from the circulation.

The first two uses apply early after an incompatible transfusion; but before they can be considered it is essential that the patient's blood group be accurately known and that the nature of the accident be determined. After a transfusion of incompatible blood it is sometimes very difficult to determine the patient's group, even with all serological aids.

Exchange Transfusion to Remove Incompatible Red Cells.

Exchange transfusion to remove incompatible red cells is not usually a practical procedure, for two reasons.

First, even with the best facilities a considerable time must elapse before arrangements can be made to perform an exchange transfusion. Although incompatible red cells may still be present in the circulation for many hours, or even days, after an incompatible transfusion, those remaining after the first few hours are almost certainly destined for extravascular destruction rather than for intravascular hemolysis. Any hemoglobinemia sufficient

to impair renal function is therefore likely to have occurred by the time an exchange transfusion can be commenced. There seems little purpose in undertaking a radical form of therapy to remove red cells which would otherwise be ingested by the reticulo-endothelial cells without harmful effect.

Second, a large amount of blood would be required to bring about an appreciable reduction in the number of incompatible red cells in the circulation. This is illustrated in the diagram (Figure III), which was prepared by a mathematical colleague to permit assessment of the effects of an exchange transfusion. It is assumed that there is rapid mixing of injected blood with that already present in the body. Some calculation must be made of the patient's blood volume, by relation to either the surface area or the weight. For practical purposes it is probably sufficient to assume that there is 0.5 litre for each stone of body weight.

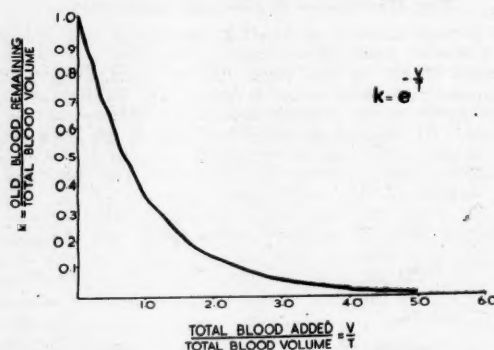


FIGURE III.

A method of determining the effectiveness of exchange blood transfusion in removing incompatible red cells or metabolites from the circulation in acute renal failure.

Application of the graph shows that an exchange of 1000 millilitres of blood in a patient with a blood volume of 5000 millilitres would remove only about 6% of the incompatible cells. In such a patient a 90% effective exchange would require 11.5 litres of blood.

Transfusion as Therapy for Anaemia or Oligæmia.

Blood transfusions are usually given to correct either anaemia or oligæmia. If an incompatibility reaction occurs, the transfused red cells are sooner or later removed from the circulation. Consequently the original transfusion has no effect on the anaemia, although the volume of fluid administered is added to the circulating blood volume and the degree of oligæmia proportionately reduced.

Oligæmia, by producing anoxia, may accelerate renal damage, and it is imperative that the blood volume be restored if there is any deficiency. Whether anaemia is also detrimental to recovery of a renal lesion and requires correction by transfusion is a matter of dispute.

The most suitable therapy for oligæmia in the absence of anaemia is intravenous injection of human serum, human albumin or one of the macromolecular plasma volume expanders, such as dextran or polyvinylpyrrolidone. Anaemia without oligæmia should be treated by transfusion of concentrated red cells, whilst whole blood should be used only when oligæmia and anaemia are both present.

Therapy of anaemia and oligæmia is sometimes not necessary after hemolytic transfusion reactions. This is due to the fact that some transfusions are administered where none is required.

Exchange Transfusion to Remove Potassium and the Products of Protein Metabolism.

The commonest cause of death after acute renal failure is overloading of the circulation with excessive therapeutic fluids. This fact emphasizes the need for strict control of water balance during therapy. It also incriminates therapy itself as a major cause of death. A conservative régime in which fluid intake does not exceed fluid loss undoubtedly produces the best results. Solutions containing sodium or magnesium sulphate and concentrated sodium chloride solutions have no place, because it is impossible to make a non-functioning kidney work by adding materials requiring excretion.

Death may also be associated with hyperpotassemia producing cardiac effects, and with uræmia manifested by increasing blood urea and creatinin values. Various methods have been advocated to reduce the blood potassium and urea levels. They include exchange blood transfusions, the use of ion exchange resins, peritoneal dialysis, intestinal dialysis and dialysis of the blood with an artificial kidney. No method is completely satisfactory. Some are technically difficult, others produce undesirable changes in the blood electrolytes, and many entail serious risk of infection with antibiotic-resistant organisms.

Exchange blood transfusions only are considered in this paper. They may be designed to exchange a large amount of blood—10 to 20 litres—or they may be limited to two or three litres, being repeated as necessary. The small-volume operation is probably the more satisfactory, because it is technically easier and often produces sufficient reduction of plasma potassium and urea levels to avert danger. Furthermore, it can usually be performed without administration of heparin to the patient and without cutaneous incisions to expose veins.

The following are important considerations in relation to exchange blood transfusions in acute renal failure:

1. At no time during the operation should there be a large difference between the amount of blood withdrawn and the amount injected. The rate of injection must never exceed the rate of removal, because cardiac overloading is a common and often fatal complication of exchange transfusion.
2. Freshly collected blood should always be used. During storage even under ideal conditions, potassium ions pass from the red cells into the plasma. This occurs rapidly at first, but gradually becomes a slower process. Exchange transfusion with stored blood would be effective in removing urea, but might even increase the degree of hyperpotassemia.
3. The stage at which exchange transfusion should be undertaken varies in different cases. It is rarely necessary before the seventh day of anuria. Subsequently the indications are based on the symptomatology of the patient and the results of biochemical investigations. The higher the potassium and urea values, the greater the absolute amount of these materials removed by exchange of a given volume of blood.

Conclusion.

It is stressed again that prophylaxis is of major importance in the acute renal failure caused by blood transfusion. Human carelessness in administering blood is common. In public hospital practice this important but potentially lethal therapeutic agent is usually the responsibility of junior members of the staff, who frequently and unjustifiably delegate important details to members of the nursing staff. In this country consideration should be given to following the practice adopted in some Scandinavian hospitals, of ranking the "intravenous department" equally with other hospital departments, such as those of pathology and radiology. Only by so doing can we hope to prevent complications, minimize reactions and achieve maximum efficiency in the use of intravenous therapy.

ACUTE RENAL FAILURE FOLLOWING TRANS-URETHRAL PROSTATIC RESECTION¹

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ACUTE renal failure is an occasional, distressing and sometimes fatal complication of transurethral prostatic resection. It occurs almost always after the patient has been in a state of shock during or immediately after surgery. In all cases which have been reported there have been excessive hemorrhage, extravasation of irrigating fluid, prolonged operating time or other complication resulting in lowered blood pressure and other evidences of shock. The only case I know of in which acute renal failure occurred and was not preceded by shock was that of a patient of mine who had oliguria the first post-operative day, then anuria, which persisted until death occurred on the fourteenth post-operative day. Sterile tap water was used as an irrigating fluid in this case. Several large venous spaces were opened during the latter part of the resection, but there was no excessive bleeding, no fall in blood pressure, and no perforation of the capsule, and no blood transfusion was given. The only thing which could be surmised as a cause of the renal failure was intravascular hemolysis from the hypotonic irrigating fluid (water) which ran into the venous sinuses during the operation.

The cause of acute renal failure following transurethral prostatic resection has never been conclusively proven. There are probably several predisposing factors to this serious complication in most cases, and intravascular hemolysis is one of these. Shock, lowered blood pressure and hemorrhage are other factors. It is significant, however, that no case of acute renal failure has been reported in which an isotonic, non-hemolytic irrigating fluid has been used. A number of instances have occurred wherein a large volume of sterile water has been mistakenly given intravenously, but no acute renal failure has developed. There must, therefore, be some cause in addition to hemolysis when the kidneys fail to excrete urine after transurethral operation.

The symptoms are characteristic. In most cases there is lowered blood pressure, sometimes preceded by a pronounced transitory elevation during the terminal stages of the operation. Excessive perspiration is usually, but not always, seen. On the first or the second post-operative day oliguria occurs. A day or two later complete anuria occurs and continues for twelve to fourteen days or until death. In patients who do not improve there are restlessness, mental confusion, then drowsiness, fever due to terminal infection, coma and death. Patients who recover begin to put out urine on the eighth to the tenth post-operative day, and excrete large quantities during the next few days.

The best treatment is prophylactic. The use of a non-hemolytic irrigating fluid is the most important. A number of these fluids have been used; the most universal is glycine. An outline of some of the solutions which have been recommended, and the advantages, disadvantages and approximate cost in Los Angeles, have been indicated in a previous paper.²

"Cytal" is a preparation made by the Cutter Laboratories, of Berkeley, California, which has the advantages of not requiring sterilization, of being pyrogen-free, of ease of preparation and of stability in solution.

Accuracy in technique is another important prophylactic measure to ensure against acute renal failure. A perforation through the prostatic capsule must be recognized as

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

²See Table I, in "The Necessity of Meticulous Technique in Transurethral Prostatic Resection", by R. W. Barnes, this issue, page 207. The composition of "Cytal" is also given in this paper.

soon as it occurs, in order to prevent extravasation of fluid into the perivesical tissues. Over-distension of the bladder must be avoided; an excessive amount of irrigating fluid may be forced into the open venous spaces, or a near perforation may become a complete one by over-distension of the bladder. Arterial bleeding must be controlled by fulguration and venous oozing by slight tension on a haemostatic bag. The resection must be kept within the confines of the prostatic urethra, and the elapsed time of surgery must not be longer than ninety minutes.

When an isotonic irrigating fluid is used, and when the technique is accurate and the operation not prolonged, acute renal failure after transurethral prostatic resection can be avoided.

INTERSTITIAL CYSTITIS.¹

By J. B. SOMERSET,
Melbourne.

INTERSTITIAL CYSTITIS is also known as Hunner's ulcer, pannural cystitis, irritable bladder, elusive ulcer *et cetera*. There have been numerous articles and published series of cases since the condition was first described by Hunner in 1914. The most noteworthy of these were a series of 100 cases reported by Higgins in 1941 and a series of 150 cases from the Mayo Clinic in 1944.

I propose to talk purely from my own personal experiences with regard to this condition.

During my urological training in England, Thompson Walker and Swift Joly maintained that there was no such condition, and that the "Hunner's phantom ulcer" of the bladder was produced by the beak of Hunner's cystoscope impinging on the bladder wall. This is obviously nonsense; but I must say that I did not myself see a case during my two years at St. Peter's Hospital, and I therefore assume that in England it is a rare condition.

Most articles have emanated from America, and I saw a number of cases when I was there. Since commencing the practice of urology in this country I have seen a considerable number. The vast majority of these cases occur in women. The reported percentages vary from 94 to 75. I have never seen a case in a male that fulfilled all the criteria.

The age incidence in females has been stated to extend from the early twenties to the eighties. In my own experience all cases have been in women of pre-menopausal or post-menopausal age, or in younger women upon whom double oophorectomy has been performed.

Clinical Picture.

These patients are among the most querulous, complaining and difficult who could be inflicted on any physician. They have usually been attended by several and have already a somewhat aggressive attitude.

The onset of the condition is insidious and the course is long. The initial symptom is frequency of micturition, which in the end becomes extreme. Early it is variable, and "good days" are interspersed with "bad days"; but in the end the frequency may be clocklike in its regularity, and urine is passed as often as every fifteen to thirty minutes, day and night.

Pain appears comparatively early and is usually the symptom of which the patients complain most. It may be suprapubic, perineal or urethral, and it occurs typically when the bladder is distended—that is, before micturition—and also after it, with a sense of incomplete emptying.

Hæmaturia is stated to occur, but in my experience is rare.

The urine is clear. It is sterile and contains no pus or only a few pus cells.

Ætiology.

The ætiology is unknown. There are several theories: (i) Infection, either local or due to sepsis elsewhere; I do not know of any real evidence to support this. (ii) Lymphatic obstruction from unspecified causes. (iii) Hormonal causes; the evidence here is the age and sex incidence, but the nature of the hormonal deficiency or imbalance is not known, and the sterile urine.

It is also suggestive that some patients obtain dramatic relief from the administration of cortisone. These are unfortunately very few. I know of two in my own practice, and one who also has rheumatoid arthritis and states that she is better since commencing cortisone therapy.

I have three cases in which examination of twenty-four hour specimens of urine has shown the presence of acid-fast and alcohol-fast bacilli morphologically indistinguishable from tubercle bacilli, two of them on one occasion only, but the third on three occasions in different laboratories. All attempts at culture in all three cases have given negative results, excretion pyelograms have been normal, and ureteric specimens of urine clear. In all these cases pyuria was present, although the cystoscopic appearances are typical. I am awaiting the opportunity to get biopsy specimens of the ulcers and have them stained for tubercle bacilli.

I wonder if an attenuated strain of this bacillus may be present and responsible.

Pathology.

I have described the macroscopic appearances on cystoscopic examination.

Microscopic examination in early cases shows the surface of the so-called ulcer to be denuded of epithelium in the centre, where there is a fibrinous slough with entangled leucocytes; around this the mucosa is oedematous. In the *tunica propria* increased vascularity, oedema and pronounced round-cell infiltration are seen. The muscle layers and the serosa also show round-cell infiltration and oedema to a lesser degree. In the later stages there is increasing fibrosis, although the monocyte inflammatory cells remain. The fibrous tissue may almost entirely replace the muscle fibres in the affected areas.

Diagnosis.

Diagnosis rests upon cystoscopic examination, and the appearances vary according to the stage of the disease.

In all cases there is grossly reduced bladder capacity, averaging about four ounces. In the early cases this is due to spasm, and in the late cases to fibrosis and contraction of the bladder.

The condition may be localized or generalized. In early cases the bladder looks comparatively normal, except for one or more reddened and slightly swollen areas on the anterior wall, the antero-lateral wall or vertex, but never on the trigone. These patches have a central small fibrinous slough, rather than a true ulcer. At attempted dilatation of the bladder these patches weep blood, and bleeding may be severe—so much so that if the bladder is distended at the commencement of the cystoscopic examination it is impossible to visualize the bladder wall.

In generalized cases the whole bladder wall weeps with petechial hæmorrhages.

In late or chronic cases the "ulcers" are stellate, with prominent radiating strands of fibrous tissue and a central shallow ulcer or fibrinous slough, the remainder of the bladder wall appearing normal. The same bleeding occurs on attempted dilatation, and the bladder capacity may be as little as two ounces.

Radiological examination shows the upper part of the urinary tract to be normal except in very advanced cases, in which there may be hydronephrosis and hydroureter from obstruction due to fibrosis of the bladder wall.

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

The differential diagnosis is from other forms of cystitis, and especially from tuberculous cystitis. The main points are the negative result on attempted culture, the negative finding in a twenty-four hour specimen, and the normal pyelograms—although in the late stages of fibrosis there may be hydronephrosis and hydroureter from obstruction at the uretero-vesical junction.

It is also very important to differentiate this condition from prolapse and cystocele.

Several of my own patients presented after a repair operation without relief of their frequency of micturition, and several more of them were referred by gynaecologists who were not convinced that their urinary symptoms were due to their cystocele.

Treatment.

Treatment is unsatisfactory, and recorded permanent cures are few.

In earlier series many patients were treated by partial cystectomy; but this operation has been discarded on account of the fact that many of the patients have multiple ulcers, widely scattered, and many more developed other ulcers after operation.

Most methods of treatment are directed at giving temporary relief, and need to be repeated at intervals of a few months.

1. Instillation of silver nitrate solution in increasing strength is not very widely used, as the results are not very good and the treatment is painful.

2. "Banthine" was hailed as an effective drug, but the results have been poor and it has been largely discarded.

3. Cortisone has recently been tried, but the results are not encouraging. Sometimes there is dramatic relief of pain and also of frequency of micturition in the early cases. In the late cases, in which fibrosis of the bladder has occurred, there is no effect on the frequency of micturition, although the pain may be relieved.

4. Forcible dilatation of the bladder under adequate general anaesthesia is widely used and is often very effective, but usually only temporarily. It is best carried out under vision through the cystoscope, and the dilatation is stopped when the mucosa begins to split and bleeding occurs. Great care is necessary, and the patient should be in hospital, because it is easily possible to rupture the bladder, usually through the site of an ulcer, and the resulting extravasation may therefore be intraperitoneal. I have had this accident occur on two occasions. In both the extravasation was fortunately extraperitoneal, and the patients responded to catheter drainage and chemotherapy. In both cases the rupture was at the site of the only ulcer present, and in both these cases after healing occurred there has been an apparently permanent cure. Neither woman will submit to further cystoscopic examination in the absence of symptoms, and I have not sufficient hardihood to make a deliberate trial of this method.

5. Cystoscopic diathermy of the affected areas of the bladder. In my opinion this is the most effective treatment in localized cases, and the most effective in generalized cases when combined with forcible dilatation. The ulcers are coagulated as deeply into the bladder wall as is considered safe, and there is therefore a slight risk of perforation. Dilatation after this procedure is more risky. It will frequently be found that after thorough coagulation of the ulcers a bladder which previously held only four ounces without bleeding will now take twelve or fourteen ounces without bleeding.

6. Ureteric transplant into the colon is a last resort, to be used only in the very severe and chronic cases in which the condition has failed to respond to all other measures. Two of my patients fall into this category; one is now awaiting operation. The other refused operation for too long and has developed gross bilateral hydronephrosis and hydroureter from fibrosis of the bladder wall. She also decided to change urologists and for some reason underwent a transurethral resection of the bladder neck, with somewhat unhappy results.

Conclusion.

In conclusion I should like to say that I have talked on this subject in the hope that the discussion may bring to light some new suggestions as to methods of attack.

OBSERVATIONS ON OCCULT CARCINOMA OF THE PROSTATE GLAND.¹

By COLIN EDWARDS,
Sydney.

THIS investigation was prompted by the advocacy of total prostatovesiculectomy for operable carcinoma of the prostate gland, including occult carcinoma discovered histologically after removal of hypertrophic tissue. Points in favour of this procedure may be stated briefly as follows: (i) It is the only known method of positive cure for prostatic carcinoma. (ii) There is a low operative mortality rate of approximately 5%. (iii) The five-year survival rate is better than 50%, which for such an extensive surgical procedure in this age group is fairly satisfactory. (iv) The survivors do not suffer from urinary retention thereafter, except for a small number with non-malignant urethral stricture.

However, there are two major disadvantages. The first is that the patients are liable to an imposing list of complications. F. H. Colby (1953), with a survival rate of 51.7%, notes the following complications of radical perineal prostatectomy in 100 cases: wrong diagnosis, 21; operative mortality, five; rectal tear, three (one patient died); ureter ligation, three (two patients died); urethral stricture (treated by dilatation), three; femoral vein ligation, ten (six cases were prophylactic); perineal fistula, two ("healed in the course of time"); permanent incontinence of urine, 12. Of the 100 patients, 35 had normal control of urine.

The second disadvantage lies in the limited applicability of this form of treatment. Most authors agree that in only 5% of cases is the condition operable at the time of diagnosis, but attempts are being made to widen this field in three directions. The obvious one is to have the diagnosis made at an early stage, for which purpose all physicians are exhorted to make rectal examinations of all men aged over fifty years. Some tumours which are extracapsular at the time of diagnosis apparently become operable under the influence of castration and oestrogens, but assessment of the value of operation in such cases is premature at the present time. Finally, the radical operation has also been strongly advocated when occult carcinoma is discovered histologically after resection or enucleation of hypertrophic tissue.

To determine the advisability of this procedure, 23 such patients operated upon more than five years ago have been studied. Most of these patients have been examined twice a year since operation. With the exception of two who developed carcinoma, and one who developed a stricture, no treatment of any kind has been given since convalescence. Recurrence caused the death of one patient twenty-nine months after transurethral resection, and of another fifteen months after enucleation. Five others are dead of unrelated causes and were apparently free from carcinoma at the time of death. The remainder (16) have no clinical evidence of cancer, and 13 are known to have a serum acid phosphatase level within the limits of normal. Five of this group were treated by transurethral resection and 18 by enucleation. None has any type of dysuria, but one patient has a urethral stricture controlled by dilatation.

There is a dearth of similar series in the literature. Labess (1952) has a series of 41 patients, followed for only three years, of whom three had a cancerous recurrence after enucleation. Nesbit and Baum (1951) report a

¹ Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

recurrence in two cases of 42 in which transurethral resection was performed; these patients were followed for three to five years. Higbee (1953) records eight cases of occult carcinoma in which no recurrence or metastasis appeared within five years, although three patients died of other causes.

Thus the only relevant figures available show a recurrence rate of about 7% and a five-year survival rate of 67% for occult carcinoma treated by resection or enucleation. Nesbit and Plumb (1946) have shown that, when all grades and stages are included, only 10% of patients may be expected to survive five years without treatment. Again including all grades and stages, Nesbit and Baum (1951) found that 44% of patients survived for at least five years when treated by orchidectomy and oestrogens. But it has been observed (Greene and Thompson, 1943; Evans, Barnes and Brown, 1942) that longevity after diagnosis is inversely proportional to the histological grade of malignancy with any given form of treatment. Only growths of the smallest dimensions are under consideration here, and it must be presumed that, if such a series of patients was treated by orchidectomy and the administration of stilboestrol, the five-year survivals would exceed 44%. It is well known that the incidence of histologically discovered prostatic carcinoma is very high; but Baron and Angrist (1941), after a study of serial sections, came to the conclusion that "because of the high incidence, the small size, and the fact that metastases are not found, it must be assumed that the tumours are very slow growing and seldom become a factor in the cause of death". The actual proportion of cases of prostatic carcinoma in which the tumour produces symptoms or becomes a factor in the cause of death is not known.

TABLE I.
Occult Carcinoma: Non-Radical Operation.

Author.	Number of Cases.	Recurrence.	Period. (Years.)	Survivors.
Labess (1952)	41	3	3	20
Nesbit and Baum (1951) ..	42	2	3	26
Higbee (1953)	8	Nil	5	5
Edwards (1954)	23	2	5	16
Total	114	7 (6.1%)	—	21 (67.7%)

Conclusions.

One interesting fact which emerges from a study of the pertinent literature is that the rate of recurrence is relatively high for about two years after treatment by any operation, but those who survive this period without relapse or metastasis have a very good prospect of living at least three years longer. In view of these opinions it seems rather unreasonable to ask a man who is suspected of having asymptomatic prostatic carcinoma to undergo the radical operation simply because his tumour is operable. Yet this is the type of case the surgeon is most anxious to meet. The greatest debits on the radical side appear to be the high morbidity rate, and the fact that a similar five-year survival rate in tumours of the same extent may be obtained by hormonal therapy. However, as a permanent cure may be obtained, and as some reduction of both these weaknesses may be anticipated with further experience under modern conditions, it is logical for surgeons with suitable facilities and staff to carry out the radical operation. In the hands of the average urologist it seems clear that the patient with occult carcinoma has better prospects of surviving without complications if he is treated conservatively.

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THE STATUS OF IMMEDIATE PROSTATECTOMY IN HOSPITAL PRACTICE.¹

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FIFTY-TWO years have passed since Freyer (1902) wrote these words:

In an advanced case of prostatic disease of this kind, the urine, even when clear and acid on the first introduction of the catheter, generally becomes clouded and eventually ammoniacal in the course of a few days, and constitutional symptoms supervene. A rigor will probably occur, or even without this the temperature may rise to 103° or 104° F; profuse perspiration sets in, and the normal temperature being reached, fever may not recur. Sometimes more than one attack of this kind occurs, or the fever may be of a continuous character for some days, gradually subsiding; but occasionally the patient sinks into a low typhoid state with dry, furred tongue, feeble pulse, and great thirst; and if the kidneys are much affected, uræmia, followed by coma, may set in, resulting in a fatal termination.

This all too common clinical picture presented by the prostatic patient stimulated Wilson Hey (1945) to attempt a new approach to the solution of the problem presented by the patient with advanced prostatic disease. Since that time, urological interest has been centred on the possible value of immediate surgery in the treatment of retention of urine due to benign prostatic hypertrophy.

Prior to Wilson Hey's work, Creevy (1938) strongly advocated abolition of methods of bladder decompression in the preparation of patients for prostatic surgery, and Davis (1942) published a selected series of 24 conspicuously good-risk patients who underwent prostatectomy without preliminary drainage. D. K. Rose (1945) also advocated the abolition of the pre-operative retention catheter in the preparation of patients for prostatectomy.

Since 1945 the majority of contributions to the surgical literature on this subject have come from England, and series of cases treated by immediate prostatectomy have been reported by Walters (1948), Hickey (1950), Hurford (1950), Wells (1952), Fergusson (1952), Aiken (1953) and Silverstone (1954).

It is the purpose of this paper to assess what part the immediate open operation can play in the treatment of a consecutive series of patients suffering from acute or chronic retention of urine due to benign prostatic hypertrophy, and to assess what results are to be expected when the indications for such a method are pushed to the limits of operability.

Classification of Patients.

Australian conditions of medical practice are somewhat different from those obtaining in the United Kingdom. This difference is largely brought about by the distances involved in the transportation of patients to medical

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centres, and for this reason alone, performance of so-called immediate prostatectomy over a large consecutive series of patients is rendered difficult. However, since September, 1950, it has been the policy of the Department of Urology at the Royal Newcastle Hospital to carry out immediate prostatectomy for acute or chronic retention of urine whenever the conditions permit of this being done. Between September, 1950, and November, 1953, 346 patients suffering from benign prostatic hypertrophy were admitted to the wards of the Royal Newcastle Hospital, and these patients

TABLE I.
Analysis of 322 Consecutive Cases.

Classification.	Supra- pubic Prostat- ectomy.	Trans- urethral Resection.	Cyst- ostomy.	Death: No Operation.	Discharged from Hospital: No Operation.
Acute retention of urine (161)	128	12	1	3	17
Chronic retention of urine (69)	53	5	2	8	1
Prostatic syn- drome (85)	70	9	0	1	5
Prostatic con- dition in- cidental (7)	0	0	0	3	4

will receive detailed consideration in the discussion to follow. It is emphasized that the type of patient about to be discussed in this paper is drawn largely from an industrial area. No patient of the private or intermediate class is included, the bulk of the patients treated being pensioners. Newcastle and its environs have a population of 250,000 people, and the majority of the patients are drawn from this area; but patients operated upon in this series include patients from as far north as the Queensland

TABLE II.
Analysis of 330 Consecutive Cases of Acute and Chronic Retention of Urine.

Condition.	Immediate Operation.	Delayed Operation.	No Surgery, Death in Hospital.	No Surgery, Dis- charged.
Acute retention of urine (161).	114 (Suprapubic prostatectomy, 113; cystostomy, 1; see Tables X and XI.)	27 (Transurethral resection, 12; suprapubic prostatectomy, 15; see Tables V and VI.)	3 (See Table IV.)	17 (See Table III.)
Chronic retention of urine (69).	46 (Suprapubic prostatectomy, 45; cystostomy, 1; see Tables X and XII.)	14 (Transurethral resection, 5; suprapubic prostatectomy, 8; second suprapubic prostatectomy, 1; see Tables VIII, IX and X.)	8 (See Table VII.)	1 (See Table VII.)

border and from mid-western New South Wales. The type of patient admitted to the Royal Newcastle Hospital, New South Wales, must resemble very closely those admitted to the wards of the Newcastle General Hospital, Newcastle-upon-Tyne, and Wardill, referring to a paper by Wilson Hey, makes the following statement:

It is certain that his statistics would show a different complexion had he to deal with the average type of case entering a Municipal Hospital (a former workhouse), dumping ground for all the creaks from other hospitals and the surrounding districts.

The Royal Newcastle Hospital, New South Wales, has never been a workhouse, but certainly the type of patient

admitted to its wards coincides very closely with the type described by Wardill.

To permit of an easy comparison with similar groups of published series of patients, the patients forming the background of this investigation have been grouped into the following four categories: (a) those with acute retention of urine, (b) those with chronic retention of urine, (c) those exhibiting the prostatic syndrome, (d) those in whom the prostatic hypertrophy was an incidental clinical finding. Group (b) includes cases of acute or chronic retention of urine, as well as those of purely chronic retention of urine. It is realized that this classification is somewhat arbitrary, and it is based partly on clinical grounds and partly on operative findings.

TABLE III.
Acute Retention of Urine, No Operation, Discharged from Hospital.

Age. (Years.)	Hospital Days.	Clinical Features.	Contraindication to Operation.
68	20	Bilateral inguinal hernior- raphy, acute retention of urine, convalescence.	Recent operation.
77	14	Acute respiratory infec- tion.	Patient signed himself out of hospital.
67	109	Active pulmonary tuber- culosis for eighteen months.	Active pulmonary tuber- culosis, chronic invalid.
61	11	Congestive cardiac failure; blood pressure 200 milli- metres of mercury, systolic, and 120 milli- metres, diastolic.	Congestive cardiac failure.
74	7	While in hospital passed urine normally.	Chronic bronchitis.
69	14	Angina pectoris, congestive cardiac failure.	Congestive cardiac failure.
95	19	Carcinoma of larynx with secondary deposits.	Carcinoma of the larynx.
64	1	An otherwise healthy male.	To attend son's wedding in two hours.
69	29	Congestive cardiac failure, old cerebral thrombosis, blood pressure 210 milli- metres of mercury, systolic, and 110 milli- metres, diastolic.	Congestive cardiac failure, pulmonary oedema.
72	6	Acute respiratory infection, diabetes mellitus.	Acute respiratory infection, diabetes mellitus.
74	2	While in hospital normal micturition.	No indication present for operation.
78	30	Attempted suicide.	Mental aberration.
80	48	Malignant melanoma, eye recently enucleated.	Recent operation, malignant melanoma.
75	61	Pyloric stenosis, recent gastro-enterostomy.	Recent operation, pyloric stenosis.
54	2	An otherwise healthy male.	Admitted to hospital on December 22, 1950.
84	66	Congestive cardiac failure.	Congestive cardiac failure.
63	2	Transient paresis of right leg two weeks prior to admission.	Cerebral arteriosclerosis, re- cent stroke.

Three hundred and forty-six patients suffering from benign prostatic hypertrophy were admitted to the hospital during the period under discussion, and these patients fell into the following groups: (a) those with acute retention of urine, 175; (b) those with chronic retention of urine, 71; (c) those exhibiting the prostatic syndrome, 93; (d) those in whom the prostatic hypertrophy was an incidental clinical finding, seven. Of these patients, surgical colleagues treated 14 with acute retention of urine, two with chronic retention of urine and eight with the prostatic syndrome, a total of 24 of these patients. The details of these patients will receive no further consideration in this paper.

Three hundred and twenty-two patients were treated by me (see Table I). These patients were classified as follows: (a) those with acute retention of urine, 161; (b) those with chronic retention of urine, 69; (c) those exhibiting the prostatic syndrome, 85; (d) those in whom the prostatic hypertrophy was an incidental clinical finding, seven. The details of the last two groups are irrelevant for further detailed discussion, and will receive consideration only in so far as they form part of the over-all picture. For detailed examination, therefore, there are for consideration 161 examples of acute retention of urine and 69 of chronic retention. The average age of the patients operated on in both of these groups was seventy-one years.

Definition of Immediate Prostatectomy.

Before I proceed further, it will be as well to define what is considered to constitute an immediate prostatectomy. It is obvious that patients suffering from chronic retention of urine, who usually do not complain of discomfort, can scarcely be considered to present surgical emergencies in the ordinarily accepted sense of the term. In so far as no active measures such as pre-operative bladder decompression are undertaken, such cases can be considered as "immediate operations", even though the patients may have been in hospital a week or more prior to operation. In the "acute" group, or with acute on chronic types of retention, the situation is different, as

TABLE IV.
Acute Retention of Urine, No Operation, Death in Hospital.

Age. (Years.)	Hospital Days.	Clinical Features.	Post-Mortem Findings.
87	4	Bronchospasm, broncho-pneumonia, unsuitable for anaesthesia.	Prostate only examined.
80	64	Invalid four years following pneumonia, mental aberration, incontinent of faeces, congestive cardiac failure. Resolving pneumonia, acute retention of urine in hospital, general condition precluded any treatment.	Coronary sclerosis, thrombosis, heart failure, nephrosclerosis, pyelonephritis, cystitis. No post-mortem examination.
88	32		

pain demands relief, which can be afforded in many cases by suitable sedation, while in others relief from bladder distension is imperative if immediate operation is not performed.

For the purposes of this discussion, all patients operated upon within forty-eight hours of their admission to hospital

TABLE V.
Acute Retention of Urine, Suprapubic Prostatectomy, Not Immediate.

Age. (Years.)	Clinical Features.	Contraindication to Immediate Surgery.
74	Indwelling catheter one week elsewhere, Parkinson's disease, epilepsy, old empyema.	Parkinson's disease, epilepsy, old empyema thoracis.
76	Breathless on exertion, temperature 104° F., wheezes all over chest.	Bronchopneumonia, bronchitis.
70	Ruptured duodenal ulcer, acute retention of urine, convalescence.	Recent surgery.
67	Fracture - dislocation of shoulder, retention of urine, convalescence.	Recent severe injury.
58	Left inguinal herniorrhaphy, retention of urine, convalescence.	Recent surgery.
68	Consolidation at base of left lung.	Acute chest condition.
76	Gastroenterostomy, acute retention of urine, convalescence.	Recent surgery.
75	Congestive cardiac failure.	Congestive cardiac failure.
64	Acute retention of urine.	Nil.
69	Acute retention of urine.	Nil.
66	Acute retention of urine.	Nil.
62	Acute retention of urine.	Nil.
84	Acute retention of urine.	Nil.
81	Acute retention of urine.	Nil.
71	Acute retention of urine.	Nil.
60	Acute retention of urine.	Nil.

are classified as "immediate operations". Many of these patients had undergone bladder catheterization by their own physicians prior to admission to hospital, but many of them were operated upon direct from the casualty department and from the street.

Technique.

Although the surgical technique employed in the cases in which immediate open operation was performed is not primarily under discussion, the operation is described briefly for the sake of completeness. Suprapubic prostatec-

tomy by the transvesical route was the operation performed as a routine, the operation in all its essentials closely following the principles laid down by Freyer. Haemostasis was secured by means of a Foley type catheter with the bag inflated in the prostatic cavity. The bladder and pre-vesical space were drained in all cases by the suprapubic route. Bilateral vasectomy was performed as a routine, and all patients were treated with penicillin and streptomycin during their convalescence.

Contraindications to Immediate Operation.

In a discussion on such a controversial subject as immediate prostatectomy, an analysis of those cases in a consecutive series of hospital admissions to which the method was not applied or could not be applied is essential to an evaluation of the method (Tables II to X). The patients in this series to whom the method was applied, and those to whom it was not or could not be applied, will therefore be subjected to detailed analysis. The patients in this series not treated by immediate operation were treated by prostatectomy along orthodox lines, by transurethral resection, or by cystostomy. Some of the patients died in hospital, surgical treatment being impossible, while others were discharged from hospital, no operation having been attempted.

This analysis shows that in 47 out of 161 cases of acute retention of urine, death was imminent in three instances,

TABLE VI.
Acute Retention of Urine, Transurethral Resection, Not Immediate.

Age. (Years.)	Clinical Features.	Contraindications to Immediate Operation.
90	Severe dyspnoea at rest.	Cardiac failure.
59	Followed diagnostic cystoscopy.	Small gland.
82	Congestive cardiac failure.	Cardiac failure.
63	Positive Wassermann reaction, perforating ulcer of the foot, auricular fibrillation.	Systemic disease, cardiac disease.
50	Acute pulmonary oedema.	Cardiac.
73	Negative rectal findings, cystoscopy.	Negative rectal findings, small gland.
86	Acute pulmonary oedema.	Cardiac.
69	Severe dyspnoea, chronic bronchitis.	Pulmonary.
86	Negative rectal findings, cystoscopy.	Negative rectal findings, small gland.
82	Very poor general condition, senile.	General debility.
78	Third degree burn of leg, negative rectal findings, cystoscopy.	Negative rectal findings, small gland.
65	Carcinoma of prostate gland discovered at open operation.	Carcinoma of prostate.

and in 35 cases a positive contraindication existed which prevented immediate open operation being performed. Therefore 24% of the cases in this category were unsuitable for immediate suprapubic prostatectomy.

Of the 69 cases of chronic retention of urine or acute on chronic retention of urine, death was imminent in eight, and in 12 cases a positive contraindication prevented the carrying out of a definitive operation. So in 29% of the cases in the chronic group, immediate suprapubic prostatectomy could not be applied.

When the figures for the acute and chronic groups of retention of urine are combined, of the 230 cases in these categories, immediate suprapubic prostatectomy was found to be impossible in 58, or in 26% of the cases classified in these two groups.

The contraindications present precluding immediate operation in these cases were as follows. In the acute group, cardiac failure heads the list, preventing immediate operation in 10 cases; recent major operation, six examples; chronic chest conditions, five; acute chest conditions, three; and negative rectal findings in three cases prevented immediate operation. Other contraindications met with in this group were as follows: carcinoma of the larynx, one case; attempted suicide, one; cerebral vascular disease, one; Parkinson's disease, general debility and syphilis, one

each. It will be seen that the only specific urological contraindications met with in this group of patients were syphilis in one case and negative rectal findings in three; the others are contraindications to any major surgical procedure.

Absolute contraindications to immediate operation met with in the chronic group include the following: cardiac conditions, five cases; advanced uræmia, four; uncontrolled diabetes, two; acute chest condition, one; carcinoma of the bladder, one; hæmaturia, one; epilepsy, one. It will

group the retention of urine was complicated by *diabetes mellitus*. These patients were all known diabetics, and all of them were subjected to immediate operation and had an uneventful convalescence. In one of these cases the retention of urine was further complicated by the presence of a prostatic abscess and a prostatic calculus. The type of diabetes in these patients was of the benign senile variety. Syphilis was encountered twice. One of these patients was treated by transurethral resection and the other by immediate open operation.

TABLE VII.
Chronic Retention of Urine, No Operation, Death in Hospital.¹

Age. (Years.)	Hospital Days.	Clinical Features.	Post-Mortem Findings.
69	6	Too ill to give history, uræmic.	Bilateral hydronephrosis, hydro-nephrosis and pyelonephritis.
66	2	Congestive cardiac failure, ascites.	No post-mortem examination.
72	4	Coronary occlusion, gallop rhythm, cardiac asthma.	No post-mortem examination.
91	3	Too ill to give history.	Ischaemic changes in heart, nephrosclerosis, pyelonephritis.
72	25	Hæmaturia, chronic retention of urine, cystoscopy showed carcinoma of bladder, blood urea level, 62 milligrammes per 100 millilitres.	Pyelonephritis, carcinoma of bladder.
66	6	General state precluded anaesthesia or operation, blood urea level 285 milligrammes per 100 millilitres.	Lobar pneumonia, pyelonephritis.
84	1	Uræmic, incoherent, resisting examination.	Subarachnoid hæmorrhage.
87	11	Cardiac asthma, disorientated.	No post-mortem examination.

¹ Another patient, aged sixty-four years, was discharged from hospital after thirty days without operation. He was uræmic (blood urea level 81 milligrammes per 100 millilitres), and had hiccups. The contraindications to operation were epilepsy present for years (one to three fits per day), and *diabetes mellitus*. He was certified insane.

be seen from these figures that in this group specific urological contraindications occur more frequently than in the acute group—namely, advanced uræmia, carcinoma of the bladder and hæmaturia, although cardiac disease again heads the list.

TABLE VIII.
Chronic Retention of Urine, Suprapubic Prostatectomy, Not Immediate.

Age. (Years.)	Clinical Features.	Contraindication to Immediate Operation.
72	Otherwise healthy male.	Nil.
77	Otherwise healthy male.	Nil.
76	Indwelling catheter on admission to hospital, urinary infection, cystostomy, second stage prostatectomy.	Nil.
68	Recent operation for glaucoma.	Recent operation.
75	Rapid auricular fibrillation.	Cardiac.
65	Uncontrolled <i>diabetes mellitus</i> .	Uncontrolled diabetes.
68	Indwelling catheter for two years, blood urea level 206 milligrammes per 100 millilitres, hæmaturia.	Hæmaturia.
79	Congestive cardiac failure.	Cardiac.

Associated diseases which might have influenced the choice of treatment, but which did not prevent a successful outcome after immediate suprapubic prostatectomy, were met with commonly. Several of the more interesting conditions met with will be mentioned. Primary carcinoma of the ureter was encountered once in this series of patients, and this was in a patient aged eighty-three years who developed acute retention of urine after diagnostic cystoscopy and pyelography. Nephro-ureterectomy and suprapubic prostatectomy in one stage were performed with uneventful recovery. In four cases in the acute retention

TABLE IX.
Chronic Retention of Urine, Transurethral Resection, Not Immediate.

Age. (Years.)	Clinical Features.	Contraindication to Immediate Operation.
78	Rectal findings indicated carcinoma of prostate.	Apparent carcinoma clinically, no carcinoma found by resection.
63	Multiple suprapubic vesical operations for stone, cystoscopy, small prostate gland, vesical calculi.	Multiple suprapubic operations, small prostate on cystoscopic examination.
65	Double hemiplegia, pseudo-bulbar palsy, bilateral cataracts.	Severe cardiovascular disease.
60	Bilateral pulmonary tuberculosis.	Severe systemic disease.
81	Mental aberration, bed rails around bed <i>et cetera</i> .	Severe mental changes.

In the chronic retention group, *diabetes mellitus* was associated with the retention of urine in one case. In this case a chronic urinary infection further complicated the clinical picture, and the attending physician advised control of the diabetes before prostatectomy was performed. In this case no method of bladder drainage was employed during the pre-operative preparation. One patient in the chronic group, aged sixty-nine years, presented a long history of repeated attacks of melæna due to a proven duodenal ulcer. He was first examined with chronic retention of urine during an acute attack of melæna, and his blood urea content was then 239 milligrammes per 100 millilitres. Urgent blood transfusion was given, and immediate prostatectomy was performed; an uneventful recovery followed. When this patient was examined three months after operation, his blood urea content was 40 milligrammes per 100 millilitres.

TABLE X.
Cystostomy: Chronic Retention of Urine, 2 (1 Immediate); Acute Retention of Urine, 1 (Immediate).

Age. (Years.)	Clinical Features.	Indication.
62	Chronic retention of urine, uræmia, blood urea level, 357 milligrammes per 100 millilitres.	Blood urea level, uræmia.
76	Recent fracture of neck of femur (Smith-Petersen nail), treated by indwelling catheter, then urinary infection, cystostomy, delayed suprapubic prostatectomy, hospital days 81.	No positive indication for cystostomy.
65	Acute retention of urine, surgeon embarked upon immediate suprapubic prostatectomy, operative findings carcinoma, cystostomy, followed by transurethral resection.	Carcinoma of prostate diagnosed at open operation.

Epididymitis, in either the acute or resolving stage, has not been found to constitute a contraindication to the immediate operation. After section of the *vas deferens* this condition resolves rapidly.

Mortality.

In the 114 cases in the acute retention group in which immediate operation was undertaken, 113 suprapubic prostatectomies and one suprapubic cystostomy were performed. One hundred and one patients were operated upon on the day of their admission to hospital, or on the day of

onset of retention of urine; nine within twenty-four hours of their admission, and four within forty-eight hours of their admission. The cystostomy was performed in a case in which it was intended to perform suprapubic prostatectomy, and at operation carcinoma of the prostate was found to be present. This patient subsequently came to trans-urethral resection.

In the chronic group of 69 cases, 33 patients were operated upon on the day of their admission to hospital, seven within twenty-four hours of their admission, and six within forty-eight hours of their admission. Immediate suprapubic prostatectomy was performed in 45 cases, and a suprapubic cystostomy was established in one.

In the acute retention group submitted to immediate prostatectomy, five deaths occurred, an operative mortality of 4% for the group.

In the chronic retention group submitted to immediate open operation ten deaths occurred, nine following immediate suprapubic prostatectomy, and one following the immediate establishment of a suprapubic cystostomy, a mortality rate of 20% for this group.

Sixteen patients with acute retention of urine were not treated by immediate open operation, but subsequently came to suprapubic prostatectomy. In this group, one patient died of shock on the day after operation.

In the chronic group of patients not treated by immediate prostatectomy, eight subsequently came to operation, and one-stage suprapubic prostatectomy was performed on seven, and a two-stage operation on one. There were no deaths in this group of patients.

Seventy patients suffering from symptoms only had suprapubic prostatectomy performed, and in this group of patients there were two deaths, a mortality of 3% for this group.

Therefore 252 consecutive suprapubic prostatectomies were performed in this series of 322 patients for acute or chronic retention of urine or as an operation of election for symptoms only, with an over-all mortality for the whole series of 7%. In the whole series, 88% of the operations were performed within forty-eight hours of the patient's admission to hospital.

Autopsy was performed on all the patients who died after immediate operation in the acute retention group; of the five deaths which occurred, pulmonary infarction was responsible for three, bronchopneumonia for one, and acute pyelonephritis for one (Table XI).

In the chronic group of cases, nine deaths followed immediate suprapubic prostatectomy (Table XII). An autopsy was obtained in seven of these cases, and in one the gland alone was examined. It was proven to be carcinomatous. This patient died of uræmia. Three other patients in this group were clinically diagnosed as suffering from uræmia, and at the post-mortem examination severe renal damage and pyelonephritis were found in all of them. Three patients died of cardiac failure, and one died of pulmonary embolism. Unfortunately, no autopsy could be obtained on this last patient. One patient died in coma; this was clinically a cerebral death, and at autopsy gross cerebral softening was found.

Period in Hospital.

The average total period in hospital for those patients admitted for acute retention of urine and treated by immediate suprapubic prostatectomy was nineteen days. In the cases of chronic retention of urine treated by immediate open operation, the average total period in hospital was twenty-one days.

Blood Urea Level.

The blood urea findings are set out in Table XIII.

The blood urea level of those patients upon whom suprapubic prostatectomy was performed was recorded in most cases, and it has been found that in acute retention of urine the blood urea level is usually not elevated. In this series no value higher than 70 milligrammes per 100 milli-

litres was encountered. In the patients operated upon for symptoms only, low values were the rule, but one patient was encountered in this group with a blood urea level between 70 and 90 milligrammes per 100 millilitres. In the chronic group high values were fairly common. The highest level of blood urea, in a patient successfully operated upon by immediate suprapubic prostatectomy in this series, was 340 milligrammes per 100 millilitres. This patient, aged sixty years, was discharged from hospital twenty-four days after operation, when his blood urea level was 150 milligrammes per 100 millilitres. Examination three months later disclosed that his blood urea value was still 100 milligrammes per 100 millilitres. Two patients were operated upon with blood urea levels lying between 350 and 400 milligrammes per 100 millilitres. Both of these patients perished. On one of them only a suprapubic cystostomy was established. This was a patient aged sixty-two years, whose blood urea level was 357 milligrammes per 100 millilitres, and he died of uræmia twenty-two days after the cystostomy was established. The post-mortem examination revealed gross bilateral hydronephrosis and pyelonephritis. The second patient in this group was aged eighty-three years, and his blood urea level was 393 milli-

TABLE XI.
Immediate Suprapubic Prostatectomy, Acute Retention of Urine, Post-Operative Deaths.

Age. (Years.)	Hospital Days.	Clinical Features.	Post-Mortem Findings.
85	6	Blood pressure, 220 millimetres of mercury, systolic, and 130 millimetres, diastolic. Cardio-respiratory death.	Pulmonary infarction.
70 69	2 21	Sudden death after operation. Invalid for nine months, dyspnoea; urological convalescence uneventful; respiratory death.	Pulmonary infarction. Pulmonary infarction, lobar pneumonia, cystitis.
70	8	Left inguinal herniorrhaphy; acute retention of urine, convalescence; respiratory death.	Emphysema; bronchopneumonia.
72	9	Clinically acute pyelonephritis after operation; hiccup.	Myocardial failure, nephrosclerosis, cerebral oedema, pyelonephritis, coronary sclerosis.

grammes per 100 millilitres. Immediate prostatectomy was performed, and it was followed by an uneventful urological convalescence. It was then decided to give him a blood transfusion because of secondary anaemia. After the blood transfusion his blood urea level rose from 220 to 411 milligrammes per 100 millilitres, and he died of uræmia twenty days after operation.

Two patients were operated upon whose blood urea level was 250 to 299 milligrammes per 100 millilitres, and one recovered; four were operated upon whose blood urea level was 200 to 249 milligrammes per 100 millilitres and three recovered; two were operated upon with blood urea levels of 150 to 199 milligrammes per 100 millilitres, and one recovered; and eight were operated on with blood urea levels of 100 to 149 milligrammes per 100 millilitres and seven recovered.

On the other hand, a fatality occurred in the chronic retention group; this patient's blood urea level was 21 milligrammes per 100 millilitres, and he died of uræmia thirty-four days after operation.

Except when it is excessively high—that is, 300 milligrammes per 100 millilitres or over—the blood urea level has not been found to be any indication as to the likely outcome of immediate suprapubic prostatectomy in this group of patients, and it has been measured merely as a matter of interest.

Blood Loss.

Information relating to blood loss is set out in Table XIV.

The blood lost at operation was measured in a considerable number of cases by the relatively crude method of

TABLE XII.

Immediate Suprapubic Prostatectomy, Chronic Retention of Urine; Post-Operative Deaths, Nine from Suprapubic Prostatectomy, One from Cystostomy.

Age. (Years.)	Hospital Days.	Case Number.	Clinical Features.	Post-Mortem Findings.
82	2	I	Uremic (blood urea level, 271 milligrammes per 100 millilitres), uræmic death.	Prostate only examined, adenocarcinoma.
56	34	II	Blood urea level, 21 milligrammes per 100 millilitres, uræmic death.	Hydroureter, hydronephrosis; pyelonephritis; right lung abscess.
83	20	III	Uremic (blood urea level, 393 milligrammes per 100 millilitres); urological convalescence normal; blood transfusions for anaemia; uræmic death.	Pyelonephritis; right lung consolidated.
79	1	IV	Pus from both ureters seen at operation, cardio-vascular death.	Bilateral pyelonephritic abscesses; both renal pelvis dilated and contained pus.
62	2	V	Blood urea level, 184 milligrammes per 100 millilitres, cardio-vascular death.	Post-operative shock, pulmonary congestion; chronic cystitis; nephrosclerosis.
90	5	VI	Sudden death five days after operation; cardio-vascular death.	No post-mortem examination.
79	7	VII	Congestive cardiac failure, chronic retention of urine; cardio-vascular death.	Myocardial fibrosis; coronary atheroma; pleural effusion.
62	54	VIII	Blood urea level, 136 milligrammes per 100 millilitres, drowsy, auricular fibrillation, alternating coma and lucid intervals after operation, bedsores; cardio-renal death.	Nephrosclerosis; pyelonephritis; pulmonary congestion; bedsores, heart failure.
66	10	IX	Old hemiplegia; difficult anaesthesia; bedsores; cerebral death.	Right cerebral softening, frontal temporal and parietal lobes involved, cardiac fibrosis, cardiac aneurysm.
62	27	X	Blood urea level, 357 milligrammes per 100 millilitres; gallop rhythm; suprapubic cystostomy only; uræmic death.	Bilateral hydroureter, hydronephrosis.

measuring the volume of blood in the sucker bottle at the completion of the operative proceedings. As sponges were not used as a routine, the figures thus obtained are sufficiently accurate for a comparison to be made of the blood lost at operation in the different groups. The average amount of blood lost at operation for the acute retention group was eight ounces; in the chronic retention group 12 ounces, and by the patients operated upon as procedures of election, 11 ounces. It is thus seen that there is no significant difference in the blood loss at operation in the different groups.

Blood Transfusion.

The records (Table XV) show that blood transfusion was given to 18 patients in the acute retention group during operation, in 11 in the chronic retention group, and to eight in the group being operated upon for symptoms only. During convalescence three of the acute retention group, nine of the chronic group, and seven of the patients in the third group received transfusions. Many of the transfusions given during the operation were given at the direction of the anaesthetist, and it is my opinion that a number of these were not necessary.

Surgical Pathology.

In the acute retention group, the average weight of the adenoma enucleated was 70 grammes, in the chronic retention group 61 grammes, and in the group exhibiting the prostatic syndrome, 41 grammes. The type of adenoma enucleated in the various groups is shown in Table XVI.

The small fibrous gland was encountered in five cases of the acute retention group. Prostatic carcinomata were met with in two of the acute cases, and in four of the chronic type. In the acute cases these were obviously carcinomata

at operation, while in two of the chronic cases the gland was easily enucleated and the carcinoma was detected only by microscopic examination.

Associated pathological conditions were met with fairly frequently in the adenoma, and in the bladder at operation. In the adenoma in the acute retention group, infarction was met with in five cases, squamous metaplasia in two, prostatic calculi in three, and prostatic abscess in five. In the acute retention group vesical calculi were met with in five cases; these were multiple in four instances and single in one.

In the chronic retention group, associated pathological conditions met with in the adenoma include squamous metaplasia in one case, prostatic abscess in one, and prostatic calculus in one. Vesical calculi occurred in nine patients in the chronic retention group. These were multiple in five cases and single in four.

Discussion.

This series of patients treated by immediate prostatectomy has demonstrated that the method could not be applied in 24% of the patients admitted to hospital with acute retention of urine due to benign prostatic hypertrophy, and in those patients in this group to whom the method was applied, a mortality rate of 4% followed. The conditions precluding immediate operation in this group of patients were mainly not urological. It is my opinion that a mortality rate of 4% in this series of patients with acute retention of urine more than justifies the use of the method. It may be said in criticism that the patient admitted to hospital with acute retention of urine for the first time may be fortunate enough after catheterization to recover normal urinary function. It is impossible on clinical grounds to determine which patients will follow

TABLE XIII.
Blood Urea Level.

Condition.	Blood Urea Level (Milligrammes per 100 Millilitres).									
	Not Recorded.	Less than 40.	40 to 69.	70 to 99.	100 to 149.	150 to 199.	200 to 249.	250 to 299.	300 to 349.	350 to 400.
Acute retention of urine	18 (2) ¹	31	29 (1)	0	0	0	0	0	0	0
Prostatic syndrome	32 (2)	43 (2)	50 (3)	15 (1)	0	0	0	0	0	0
Chronic retention of urine	3 (1)	11	15 (2)	11 (2)	8 (1)	2 (1)	4 (1)	2 (1)	1	2 (2)

¹ The figures in parentheses indicate deaths occurring in the group.

such a course, and the possibility of converting a relatively "good risk" surgical subject to a "poor risk" patient after catheterization is relatively high. It is agreed that the patient with acute retention of urine may also be an unknown, uncontrolled diabetic subject. In my experience this possibility has been found to be theoretical rather than practical, and moreover, a specimen of urine can be taken from the bladder at the time of operation and submitted to full analysis. This has been done as a routine measure in this series of patients. It is well known that the findings on rectal palpation are difficult of assessment in the presence of a distended bladder. Particularly do these remarks apply to the determination of the size of the prostate gland by rectal examination, and to the determination of tenderness due to intrinsic pathological conditions in the prostate gland itself, such as prostatic abscess. The patients with prostatic abscesses encountered

trophy. It is in regard to the necessity for preliminary drainage that the chief differences of opinion exist. On this point well recognized authorities have expressed diametrically opposite opinions. Wilson Hey, the protagonist of immediate prostatectomy in 1945, retracted his original views in 1949, when he stated that in about 2% of cases of chronic retention with renal failure he now employed slow decompression. Riches (1949) is of the opinion that drainage is necessary in most cases of chronic retention, and that sudden decompression should be avoided owing to the risk of intrarenal hemorrhage with subsequent tubular blockage. Millin (1949), Band (1949) and Winsbury-White (1949) all agree with Riches. On the other hand, Wells (1949) maintains that renal failure due to obstruction should best be relieved by the immediate and complete removal of that obstruction, and that after this procedure he has often seen fountains of water coming down the

TABLE XIV.
Blood Loss at Operation.

Condition.	Recorded.	Not Recorded.	Average Loss. (Ounces.)
Acute retention of urine	43	85	8
Chronic retention of urine	33	21	12
Prostatic syndrome	14	56	11

in this series have uniformly done well after immediate prostatectomy. In the presence of negative rectal findings, apart from those which are commonly associated with an over-distended bladder, immediate prostatectomy should not be performed without further investigation—namely, cystoscopic examination. The size of the gland to be removed is the concern of those who practise transurethral resection, rather than of those who practise the open operation. In this respect, it is of interest to observe that the average weight of the adenoma enucleated in the acute retention group was seventy grammes, and in the chronic retention group 61 grammes.

If the commonly accepted views as to the aetiology of post-operative pulmonary infarction are correct, the method of immediate suprapubic prostatectomy for acute retention of urine should be best calculated to prevent this tragedy. Yet in this series pulmonary infarction was responsible for three of the five deaths which occurred. This complication has been a bugbear of prostatic surgery since the latter years of the last century, and as it has occurred after all types of prostatic operations, it can hardly be said that the method of immediate prostatectomy is in any way responsible for its occurrence in this particular series. Neither can it be said that a period of bed rest with an indwelling catheter would have made it any safer for these patients to undergo a major surgical procedure. The other two deaths which occurred in this group were both infective—one from chest infection and the other from acute pyelonephritis—and these, it is emphasized, occurred in spite of penicillin and streptomycin.

The position is not nearly so clear-cut with regard to the immediate operative treatment of patients with chronic retention of urine, and in the treatment of those with acute on chronic retention due to benign prostatic hyper-

TABLE XV.
Blood Transfusions Given.

Condition.	During Operation.	During Convalescence.
Acute retention of urine	18	3
Chronic retention of urine	11	9
Prostatic syndrome	8	7

ureters but never any blood. With this last observation I heartily concur. Even concerning the question of the frequency of sepsis in these cases, very divergent views have been expressed by Band (1949) and Wells (1949).

However, all urologists are agreed that patients with chronic retention of urine with renal failure, and those patients with acute on chronic retention of urine, comprise a surgical group which includes some of the worst possible material from the point of view of the performance of a major surgical procedure. It is in this group of patients that the bulk of the surgical mortality following prostatectomy occurs. Yet one seldom sees published mortality rates which refer specifically to this group. In order to obtain a standard of comparison for the results achieved by the method of immediate prostatectomy when applied to patients with chronic retention of urine, or acute on chronic retention of urine, one is forced to compare the mortality rate following this procedure with mortality rates which refer to over-all series of cases including all types. Numerous published series are available in the literature showing the results of orthodox suprapubic prostatectomy and referring to over-all series including both "good risk" and "poor risk" patients. Melick (1943) gives a mortality rate of 15% for the one-stage suprapubic operation, and a mortality rate of 7% for the two-stage procedure. Harbord (1943) records a mortality rate of 15% in a series of 94 patients, all of whom were treated along accepted lines. In 43% of these cases a first-stage cystotomy was performed, and in 56% of them a modified Harris operation was carried out. McCrea (1945) reported a series of 581 patients suffering from benign prostatic hypertrophy who were treated along orthodox lines. Of these, 124, or 21%, were found to be unfit for operation, and 90, or 15%, refused operation. Three hundred and

TABLE XVI.
Surgical Pathology (Adenoma Type).

Condition.	Both Lateral Lobes.	One Lateral Lobe.	Lateral Lobes and Sub-cervical Lobes.	Lateral Lobes and Posterior Commissure.	Lateral Lobes, Posterior Commissure and Sub-cervical Lobes.	Small Fibrous Prostate.	Carcinoma.	Not Recorded.
Acute retention of urine	58	1	20	52	2	5	2	0
Chronic retention of urine	22	0	20	9	2	0	4	1
Prostatic syndrome	21	0	14	37	2	3	2	0

sixty-seven, or 63%, were subjected to operation. Two hundred and seventeen suprapubic prostatectomies were performed with 36 deaths occurring in the group, a mortality rate of 17%. The average post-operative stay in hospital was thirty-three days. Creevy (1951) gives an over-all mortality rate of 7% for 3573 prostatectomies, representing a combined series of the following: Young (1926), 1000 cases; Barney (1936), 816 cases; Hunt and Walters (1938), 1000 cases; and Millin (1949), 757 cases. A combination of the results in smaller groups of cases reported by 22 different surgeons gave Creevy a further 2760 cases of prostatectomy for analysis, and these carried a mortality rate of 5%. All these cases, except those of Walters (1948) which are included, were treated along orthodox lines, and Creevy makes the following statement:

Notwithstanding the fact that several of the authors reported small groups without deaths, the over-all hospital mortality was 5%, and this since the advent of antibiotics, widespread use of transfusions and modern methods of anaesthesia.

Byrne (1952) reported four deaths in 62 one-stage prostatectomies, a 6% mortality, and six deaths in 81 two-stage prostatectomies, a 7% mortality.

It is obvious to all that the method of immediate prostatectomy cannot be universally applied to patients with acute or chronic retention of urine, or to patients with chronic retention of urine admitted to hospital. It has been seen that in the present series the method could not be applied in 29% of the hospital admissions in this category, and when it was applied to 46 patients it carried a mortality rate of 20%, which at first sight may appear to be excessive. Even so, in this series of 252 consecutive suprapubic prostatectomies, the over-all mortality rate for the series was still 7%. This figure compares favourably with published figures for over-all mortality rates following suprapubic prostatectomy when practised along orthodox lines.

Nine deaths followed immediate prostatectomy performed in the chronic retention group. I hold that two of these patients (Cases IV and IX, Table XII) were obviously in the last stages of prostatic disease, and their death is to be attributed to the unavoidable mortality associated with the disease, rather than to the method of immediate prostatectomy. These two cases are examples of poor surgical selection due to over-enthusiasm for the method by the surgeon, rather than to any defect in the method itself. Two other patients (Cases V and VI, Table XII) died of post-operative shock and of pulmonary embolism respectively. These deaths cannot fairly be ascribed to the fact that the patient had an immediate operation performed. The question whether orthodox methods of treatment would have rendered five other patients (Cases I, II, III, VII, and VIII, Table XII) fit for operation is in my opinion extremely doubtful. If the cases noted above as being examples of poor surgical selection, and those in which death cannot be attributed to the method of immediate prostatectomy, are deleted from the total, it will be seen that immediate prostatectomy applied to the chronic retention group of patients reported in this series carries an unavoidable mortality rate of 13%.

The immediate surgical treatment of acute or chronic retention of urine is possible only in the practice of a large hospital, the conditions obtaining in private surgical practice not lending themselves readily to its performance.

Immediate prostatectomy in retention of urine is a method of treatment which, in suitable circumstances, guarantees the prostatic patient freedom from the morbidity and mortality associated with pre-operative drainage of the urinary tract, and freedom from the heart-breaking ennui associated with the prolonged hospitalization which necessarily accompanies staged surgical procedures. In these days of mounting costs, this latter factor is of great importance both to the individual and to the institution in which the patient receives treatment.

In those cases to which the method can be applied, it would appear to me that the treatment of such patients in any other way than by immediate operation can be justified only with difficulty. It is confidently expected that increas-

ing experience of the practice of immediate operation in the treatment of this disease, and the better selection of patients that automatically attends increasing experience, will lead to the inevitable achievement of better results than can be expected to follow more orthodox methods.

Summary.

1. A consecutive series of 321 cases of benign prostatic hypertrophy is recorded.
2. The place taken by immediate suprapubic prostatectomy in the treatment of the 161 consecutive patients with acute retention of urine, and in the treatment of the 69 consecutive patients with chronic retention of urine, encountered in this series of patients is indicated.
3. Conditions preventing the practice of immediate suprapubic prostatectomy in this series of patients are described.
4. The mortality rate following immediate suprapubic prostatectomy in this series is indicated, and the over-all mortality rate for the patients in this series treated by suprapubic prostatectomy is compared with published figures for the over-all mortality rate following suprapubic prostatectomy by orthodox methods.
5. The causes of death following immediate suprapubic prostatectomy in this series of patients are discussed.
6. The blood urea values recorded are indicated, and the value of this finding as an indication of the likely outcome of the practice of immediate operation is discussed.
7. The blood loss incurred during immediate suprapubic prostatectomy for acute or chronic retention of urine is compared with the blood loss incurred during a similar operation of election.
8. The surgical pathology present in this series of patients is recorded.
9. The status of immediate suprapubic prostatectomy in the treatment of acute or chronic retention of urine in the surgical practice of a large Australian public hospital is discussed.

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FURTHER EXPERIENCES IN AORTOGRAPHY.¹

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In a paper presented to this society last year, the apparatus, technique, difficulties, interpretation and indications for translumbar aortography were described. This short paper will discuss only further reflections on this method of investigation and present some films illustrating some of the relevant points.

The apparatus has remained the same except for one small addition. During the injection on one occasion the syringe burst; since then the injection has been made by means of an "expression board" as described by Frank Hinman, junior (1953). It has proved highly satisfactory.

In this further series the incidence of unsuccessful punctures has been higher. In five children below the age of twelve years all punctures were unsuccessful. This has previously been noted by Smith *et alii* (1952) and by Goodwin (1950).

In several other cases the puncture failed one day, but was successful when repeated. Lindgren (1953) discusses these difficult punctures and describes, in four cases, how he entered the aorta by introducing the needle on the right side of the vertebral column. One supposed that there was also a concomitant puncture of the *vena cava*. There have been four further cases of extravasation of all the dye. This has sometimes occurred when the position of the point of the needle has been confidently judged to be well in the aorta. There are several factors which may modify the position of the point of the needle after its insertion. The first is either further penetration or withdrawal during the connexion of the tubing to the butt of the needle. Secondly, owing to the high pressure in the tubing during the injection, the needle may exhibit a whiplash effect. Thirdly, also owing to the pressure effect or irritation from the medium, the aorta may go into spasm and the wall retreat from the needle point.

To combat these factors the needle should be clipped gently with an artery forceps at the skin level during the connexion of the tubing, and the point should be as close to the anterior wall of the aorta as possible. The distance between the anterior and posterior walls has averaged four to six millimetres. As a further precaution against extravasation, one may give a trial injection of a few millilitres of the dye and take a check film. However, Lindgren (1953) makes the following statement:

Even if a trial injection of a small quantity of the contrast medium shows it all to enter the lumen of the

vessel, some of the contrast substance may nevertheless be injected paravascularly during the main injection.

Extravasation is followed by epigastric pain for twelve to twenty-four hours. However, the dye is rapidly absorbed. Multiple punctures result in periaortic hæmatoma, which causes epigastric pain for a longer period.

A sample quantity of "Urokon Sodium" (70%) was kindly supplied by the Mallinckrodt Chemical Works. This medium gave better contrast than previous media, produced no toxic effects, and is judged to be the best medium available.

The automatic timing machine has been in operation for a year and has proved highly satisfactory. It is capable of taking a maximum of 20 films automatically at intervals of half a second, or any lesser number at longer intervals.

It is now thought that such a machine is not essential for the performance of aortography. Satisfactory films may be obtained on a cystoscopic table, but only up to a maximum of three to four. These may be sufficient for correct interpretation.

Three female patients with hirsutism have had an aortogram taken with a view to excluding an adrenal tumour. The exact delineation of the adrenals has proved difficult, and no tumour has been demonstrated. All these patients were obese, and a final diagnosis of bilateral hyperplasia was made.

Other workers have reproduced clear films showing a concentration and retention of dye in the case of tumours; so far, the opportunity of taking an aortogram in the case of a proven adrenal tumour has not presented itself.

Aortography has continued to prove helpful in the differential diagnosis of renal from extrarenal masses, and is a valuable accessory diagnostic measure. It is worth emphasizing that in the differential diagnosis of renal tumour from cyst, reliance must be placed only on positive findings. Poor films giving inadequate delineation are of no value—and, unfortunately, poor films are the rule when patients are obese. As was previously mentioned, secondary cystic change in a tumour may simulate a simple cyst in the aortogram. The investigation has continued to assist in the diagnosis of aberrant renal arteries, in the pre-operative assessment of renal function and/or the probability of its recovery, and in the investigation of non-functioning kidneys. Hydronephrosis has proved to be the commonest indication for aortography.

Nearly 100 aortograms have now been taken. There has been no mortality, no "scars" and no morbidity. As was previously stated, the procedure may be confidently recommended to patients with due indication.

Its final role in urological diagnosis has not been completely defined, but one notes that it is due for discussion at the next international urological meeting.

The following are some case histories illustrating how the investigations may be of value.

Reports of Cases.

CASE I.—The patient was a boy, aged thirteen years, who had had a previous left nephrectomy for hydronephrosis due to aberrant vessels. An aortogram was taken with the automatic machine and "Urokon Sodium" (70%). The films were very clear (he was only of small stature). The series was essentially normal. No aberrant vessels were demonstrated; the concentration of dye was excellent in the later films, and, in passing, it is seen how difficult it is to identify the adrenal arteries of the gland by dye concentration later in the series. (Figure I.)

CASE II.—The patient was an obese, hirsute young woman, aged thirty years, with Cushing's syndrome, who was undergoing investigations to exclude adrenal tumour. The nephrogram, from that point of view, was not helpful. There was simply the suggestion of an enlarged left gland, but neither the outline nor the density was sufficiently clear for adequate opinion.

Hyperplasia and small tumours of the adrenals are better seen by perirenal air studies, but considerable experience is necessary to detect early enlargement of these in the X-ray films.

¹ Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

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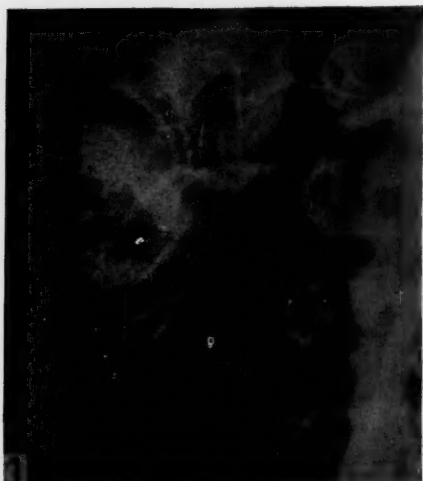
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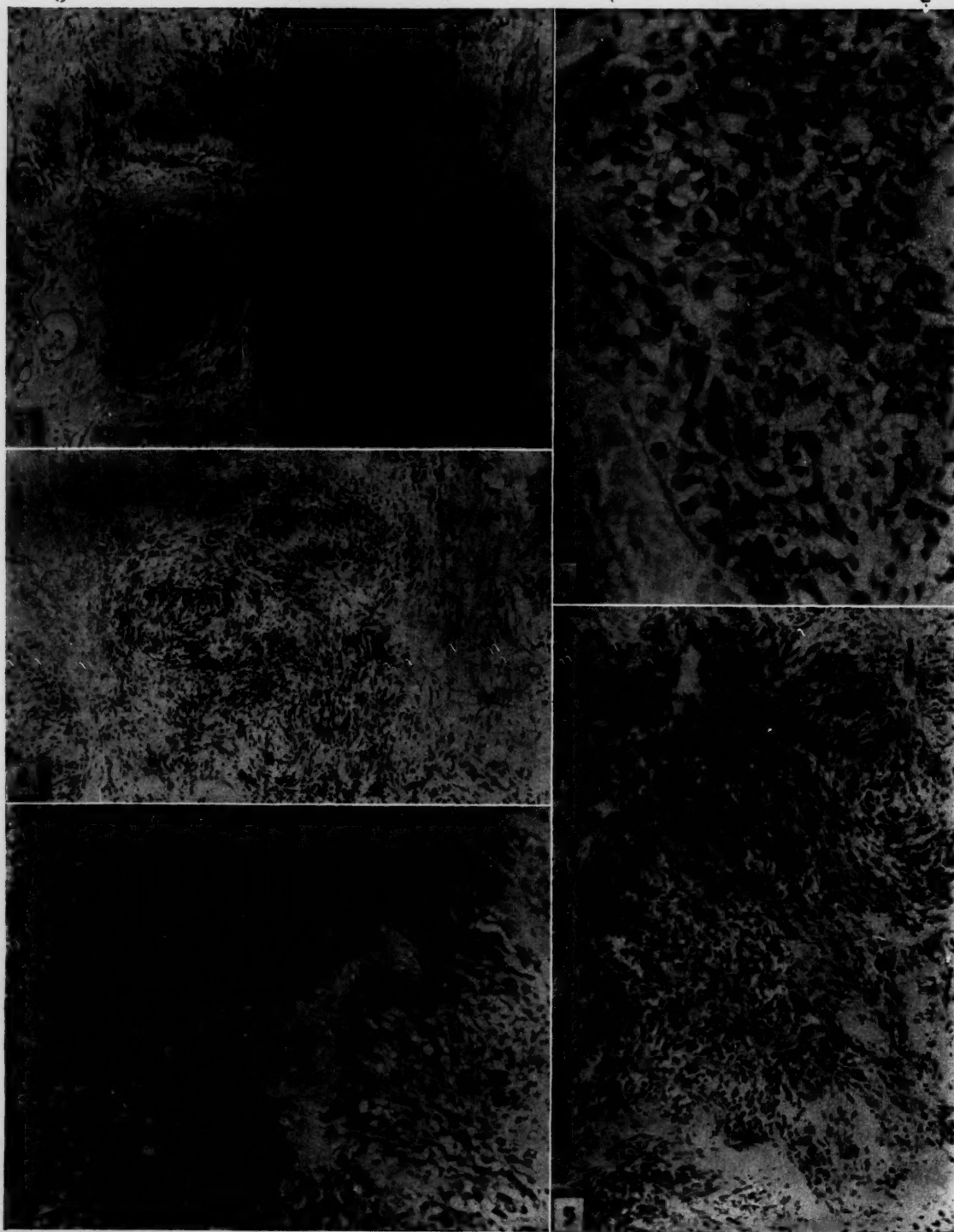
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ILLUSTRATIONS TO THE ARTICLE BY IAN F. POTTS.



ILLUSTRATIONS TO THE ARTICLE BY MALCOLM FOWLER.



CASE III.—This case demonstrates the value of aortography in the assessment of renal function and the probability of its recovery. A female patient, aged forty-three years, had a large calculus in the lower part of the left ureter. How long it had been there was unknown. An excretion pyelogram showed a non-functioning left kidney. At cystoscopic examination no indigo-carmines was excreted from this side within twelve minutes, and a catheter could not be advanced beyond the stone. All the injected sodium iodide ran back into the bladder, so that the state of the kidney was unknown. The aortogram showed a good supply to this kidney, and the dye concentrated well in the nephrogram. The ureteric stone was outlined, and the renal artery marked (Figure II). A ureterolithotomy was accordingly performed, and an excretion pyelogram one month later showed excellent function of this kidney.

CASE IV.—The patient was a male, aged thirty-five years, with bilateral hydronephrosis (Figure III). The aortogram showed on the right side two vessels coursing over the enlarged pelvis, the lower crossing the uretero-pelvic junction and delineating the medial edge of the pelvis (marked 1 in Figure III). These arose from the main artery and were not aberrant. On the left the main artery divided into two main divisions—one anterior and one posterior. The nephrogram showed better function of the upper pole than the lower on the right side. The vascular condition on both sides was confirmed at operation, and a bilateral plastic procedure was performed in two stages. An excretion pyelogram seven months later showed excellent recovery of function.

CASE V.—The patient had undergone right nephrectomy for hydronephrosis, and three months later had pain in the left loin. An excretion pyelogram showed early left hydronephrosis. An aortogram showed the cause to be aberrant vessels. There were three renal arteries.

CASE VI.—In this case investigations had shown that there were two stones in the right half of a horseshoe kidney. By pure chance the needle point was placed almost directly opposite the mouth of the renal artery supplying the upper half of what proved at operation to be a double kidney on this side, with a double pelvis and double ureter as far as was explored. Actually, the arterial supply should have suggested this possibility as, characteristically, horseshoe kidneys have a vicarious blood supply. A very clear picture of the intra-renal arterial pattern was obtained, possibly also showing its adrenal branch (marked with an arrow in Figure IV). At operation, immediately after aortography, the upper pole was found to be slightly swollen and quite bluish. One could not decide whether this was due to almost all the injected dye having gone to this limited volume of renal tissue, or to operative trauma from mobilization.

Aortography is the only means of showing vascular lesions affecting the renal arteries, as Case VII illustrates.

CASE VII.—A female patient, aged sixty-five years, was undergoing investigation for epigastric discomfort. A plain X-ray film of the abdomen revealed a crescentic calcified shadow over the right renal area. X-ray examination after a barium meal revealed a gastro-enterostomy and a possible anastomotic ulcer. A cholecystogram was reported as showing that the shadow was a stone in the gall-bladder. An excretion pyelogram showed that it was outside the renal collecting system. An aortogram showed the following abnormalities (Figure V): (i) The calcification was, in fact, in the wall of a small berry aneurysm on one of the main divisions of the right renal artery—presumably calcification in some peripheral thrombus. (ii) There was a second small aneurysm more proximally situated on the artery. (iii) The aorta and the right renal artery were affected by arteriosclerosis. (iv) The patient had a left loin scar, and no renal function on the left side was shown in the excretion pyelogram, but she denied nephrectomy on this side. The aortogram showed absence of a left renal artery, which implied that nephrectomy had been performed.

Aneurysms of the renal artery are rare and ante-mortem diagnosis is rarer still. The similarity of the calcific shadow to those seen in cases of aneurysms of the splenic artery prompted the investigation. This case of a renal aneurysm in a solitary kidney is most rare and interesting.

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A TABLE FOR THE CYSTOSCOPY ROOM.

By NOEL J. BONNIN, M.S., F.R.C.S., F.R.A.C.S.,
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THE urological table illustrated and described here was made as the result of the need to possess a good table at reasonable cost. Without the sacrifice of any feature of a table designed for urological work only, this table can also be used for general X-ray work, since the back rest lifts off and the Potter-Bucky diaphragm moves for two-thirds of the length of the table, and this allows a film to be taken of any part of the body. No provision is made, however, for an X-ray tube to work under this table, so

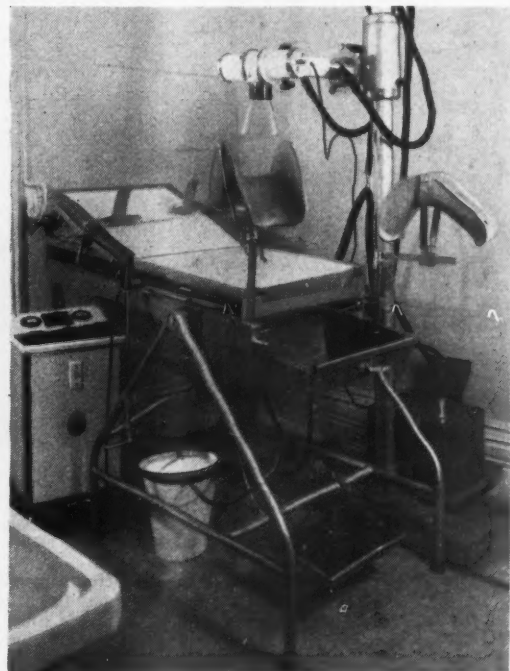


FIGURE 1.

The table in position for cystoscopy. Note that the timing gear on the Potter-Bucky diaphragm is at the head end of the table, and a cassette can be inserted right at the lower end of the table, allowing a pyelogram to be taken without disturbance during cystoscopy. The shoulder rests would not be used unless the patient was to be tilted in the head-low position.

that it would not be suitable for screening in its present form. An important feature of this table is that it allows a pyelogram to be taken with the patient in the cystoscopy position without any disturbance of patient, cystoscope or sterile drapes, for the Bucky diaphragm moves down so as to allow a cassette to be inserted right at the lower end of the table. A feature in design, which has been adhered to throughout, is that in no place on the table is any fitting

¹Read at the annual meeting of the Urological Society of Australasia, Sydney, April 5 to 8, 1954.

carried on a round bar held by a set screw, an insecure mechanical device which is a constant annoyance on most operating tables.

The stand on which this table rests is made of tubular steel, cross-braced for rigidity. It will be noted that the cross-bracing leaves the stand open at the back. The object of this is to allow a waste bucket on wheels to be run under the table, where it is out of the way and can be easily removed without the necessity for lifting it. Bronze bearings carry the heavy steel shafts which support the table top. On the left the shaft protrudes beyond the table to allow an arm carrying the X-ray tube to be bolted onto it, should this be desired. However, this is not really a good feature, as any vibration on the part of the patient is transmitted to the X-ray tube, which results in blurring of the film; and although it entails a little more trouble, the X-ray tube in this unit is carried on a separate stand. The first object of pyelography, after all, is to obtain a high-grade X-ray film. The tubular steel frame in front carries a foot rest, which can be kicked up out of the way if it is desired to tilt the table top into an upright position. The mechanism for tilting the table was made

easily for the length of the table and, most important, allows a cassette to be placed right at the lower end of the table. This movement enables the Potter-Bucky diaphragm to be pushed up clear out of the way during a cystoscopic examination and prevents any possibility of its becoming wetted, and secondly, it enables X-ray films to be taken with the patient in any position on the table, thus absolutely obviating the necessity for moving the patient during pyelography. I have found this of great practical advantage. It also allows the table to be used as an ordinary X-ray table as apart from a urological unit, if this is desired, for it moves two-thirds of the length of the fully extended table, so that X-ray films of any part of the body can be comfortably taken. This might be of considerable advantage if the table was being used by a country hospital or by any surgeon who did not

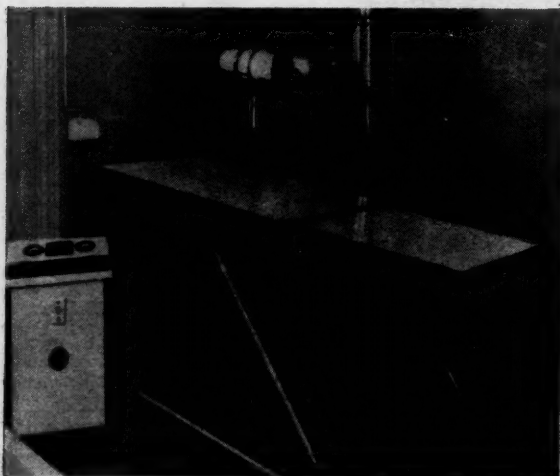


FIGURE II.

Showing the back rest removed and the lower section of the table in position. The Potter-Bucky diaphragm has been moved up a little and the table can now be used for taking an X-ray film of any part of the body.

from a motor-car jack with a little modification and some chrome plate. It is operated by a simple handle, which lacks the usual ornamental wheel, but does have a rotating grip. The movement is a little slow in operation, but is very easy, for it is normally operated by a nurse who is not necessarily selected for her muscular development. The table top, Potter-Bucky diaphragm, disappearing lower section of the table, drain tray, leg rests and other accessories are carried on a rigid steel frame of U section, to which is bolted on each side the heavy steel axles which allow it to pivot on the supporting frame. The black "Bakelite" commonly used on X-ray table tops soon becomes scratched and disfigured. The top of this table is made of two sheets of "Formica" glued and pressed to each side of a sheet of bond-wood. This provides a top of great rigidity and completely satisfactory X-ray properties. "Formica" has proved its durability in many kitchens, and is obtainable in a variety of pleasant colours. The table top is held up against a raised metal table edge, to which it is sealed by a sheet of thin rubber and rubber cement, so that the joint is completely waterproof and allows no possibility of water on the table top reaching the Potter-Bucky diaphragm. A stainless steel gutter at the operator's end of the table conducts any water into the drain tray. Under the table top the Potter-Bucky diaphragm runs

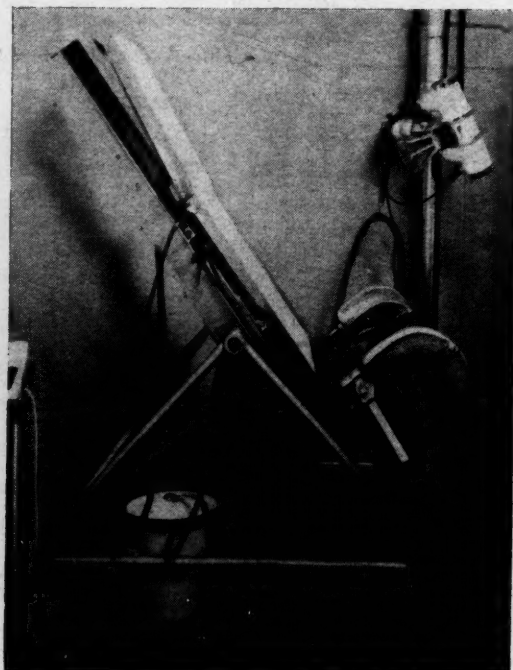


FIGURE III.

The table tilted up so that the patient is in a semi-sitting position. The seat has been dropped into place.

practise urology exclusively. In this model the Potter-Bucky diaphragm is not counter-balanced, but is held by a spring lock mechanism which rigidly locks the Potter-Bucky diaphragm in any position as soon as pressure on the operating levers is released. This automatic lock is to minimize risk of the mechanism of the diaphragm being damaged through accidental release when the table is in the upright position. Counterbalancing in this table has not been included, simply on account of cost. It would, however, be a help in adjusting the diaphragm for upright films, and it has been allowed for in the table design and could be readily inserted on this one.

The lower section of the table is carried on a sliding steel frame, which can be drawn out, and the lower table section can then be swung up into position. This lower section can then be run back against the main table to make one continuous table surface six feet long, or it can be fixed in a more extended position. The sliding mechanism runs on roller bearings and is fixed by a double positive spring lock, which needs both hands to operate it and completely prevents any risk of this rather heavy sliding mechanism falling down or slipping when the table is tilted up.

Beneath this disappearing table end the sliding catchment tray is carried, and this again is automatically held in any one of a number of positions by a spring loaded locking mechanism. The edges of the tray are folded over so as to leave a comfortable edge on which the operator's arms or elbows may rest. This catchment tray is tilted to drain back, but a drainage spout is provided at both front and back ends of the tray, so that no spillage of the contents of the tray can occur in any position of the table.

Two bars which support the sides of the tray extend well back behind it, so that the tray cannot fall into the operator's lap when fully drawn out.

The back-rest on the table is a completely detachable unit which is simply lifted off, if not desired, or can be slid forward or back on the table so that it is in a comfortable position for either a large man or a small child. It is locked in position on the table by pins which drop

abducted by pressure of the operator's shoulder, or allowed to come in again as a result of a knock on the lever by the operator's elbow. Proximal and distal movement of the leg support takes place on a bar of rectangular section, and is controlled by a locking screw. The buckets which hold the legs have a comfortable rolled edge, and are shaped so as to prevent any pressure on the popliteal vessels without leaving an uncomfortable aperture for the popliteal tissues to bulge through. The sides of the bucket are high, to allow an abducting force to be applied to the limb without any possibility of the limb slipping out of the bucket. The bucket is self-aligning and self-centring. These buckets were originally made in plaster of Paris, and an aluminium casting was taken from this.

A seat which enables the patient to be sat in an upright position on the table is fixed securely by simply dropping it into position over the transverse bar of the frame carrying the disappearing section of the table. A foot-rest is provided which is attached to the lower end of the disappearing section of the table, again by being simply dropped into position. A number of positions are provided, and in addition the sliding and automatic lock mechanism on the disappearing section of the table allows a very long

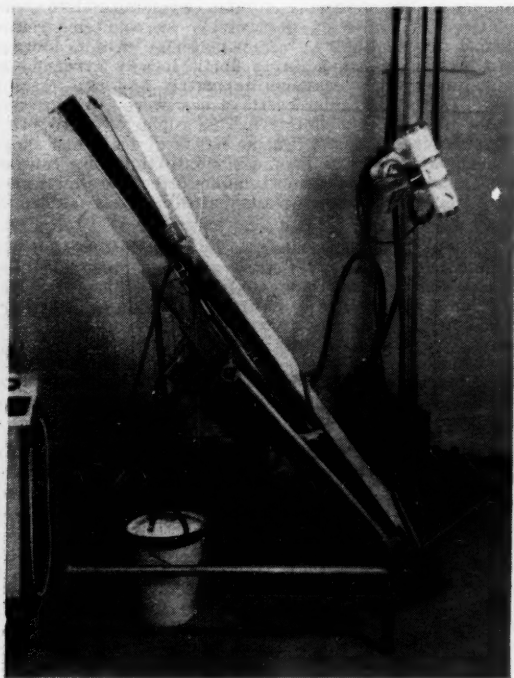


FIGURE IV.

The table tilted up with the foot-rest in place. This photograph does not show the full range of movement, for the table can still move a further 15° or so. The table can also be tilted into a head-low position for as far as 45°. It will be noted that the operator's foot-rest has been swung up out of the way.

through any one of a series of holes along the metal edge of the table top, and the back-rest itself is adjustable through a series of positions up to about 45°. On the side of the back-rest are bars to which shoulder-rests, carried on supports of rectangular section, can be attached, and these are locked rigidly in position by the turning of a single screw.

The leg-rest supports are bolted to the side of the end of the table. The whole leg-rest can be raised by simply pulling it in an upward direction, where it is automatically held. It can be released by downward pressure on the lever protruding in front. Similarly, when the patient's legs are pushed into an abducted position, they are held there by a mechanism, which again can be released by pressure on a protruding lever. The patient's legs can thus be

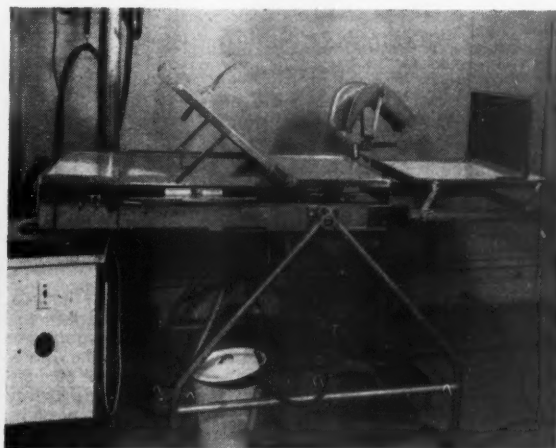


FIGURE V.

This is a composite photograph to show various features of the table. The back rest has been slid along the table so as to be in position for a short person or a child, and the mechanism of the disappearing section of the table is illustrated.

subject to be stood up comfortably. The table can be tilted into a head-low position more than 30° from horizontal and into a head-high position more than 60° from horizontal. For excretion pyelography a compression band can be clipped onto the table edges in any position desired. This is not shown in the accompanying illustrations. An adjustable arm-rest to support the patient's arm for intra-venous injections is to be added.

This table has been in constant use over the last twelve months and has measured up to all that I have required of a cystoscopy table, though, as with all first models, there are a few minor features which are susceptible of improvement. The catchment tray, for instance, in this particular model is a little deeper than necessary and tends to engage the operator's knees. The Potter-Bucky diaphragm would be better counterbalanced, as it is rather heavy to move when the table is tilted up or down, and the protruding handle on this catchment tray is to be modified; but in general the table has proved to be remarkably free of mechanical defects and highly satisfactory in use. The removable and completely adjustable back-rest and the sliding Potter-Bucky diaphragm have proved to be of great practical advantage.

Summary.

A cystoscopy table incorporating a number of desirable features has been constructed and is here described and illustrated. It has been in use only for a short period, but has proved to be highly satisfactory.

Acknowledgements.

This table has been constructed for me by E. T. and D. J. R. Both, and I have to thank in particular Mr. Don Both for his help and his skill in turning my crude sketches and descriptions first into working drawings and then into metal. My thanks are due also to one of Mr. Both's mechanics, Mr. Peter Green, for the workmanship and fine finish of the completed table.

Addendum.

Since this article was written, E. T. and D. J. R. Both have made several similar tables which incorporate these modifications, including a counter-balanced Bucky diaphragm, together with other minor improvements.

Reports of Cases.

A MALIGNANT NEURILEMMOMA.

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MALIGNANT tumours thought to arise from the connective tissues of nerves are frequently reported and are usually referred to as neurogenic sarcomata. Their appearance in the nodules of generalized neurofibromatosis is well known.

Malignant tumours arising in the well-defined, usually solitary, neurilemmomata, however, are considered by such authorities as Stout (1949) and Kernohan and Sayre (1952) to be unknown. Willis (1948), on the other hand, suggests that a certain proportion of sarcomata of non-descript microscopic structure may owe their origin to the neurilemmomata, and goes on to describe a case of possible malignant neurilemmoma. A tumour of the stomach, reported by Neri (1939), may well have been a leiomyosarcoma. Vieta and Pack (1951) use the term "malignant neurilemmoma" indiscriminately and their one possible case is not satisfactorily presented.

After a survey of the available literature it is concluded that the following case is unique in that malignant change accompanied by anaplasia is seen to arise in a neurilemmoma.

Clinical Record.

The patient, a truck driver, aged sixty years, complained of difficulty in getting out of his truck because of leg stiffness, present for six weeks. During this time he had suffered from spasms of pain starting in the lumbar region and passing around to both groins. Because of retention of urine an enlarged prostate was removed, and this was followed by incontinence of urine. Pain in both legs was then noticed, with the rapid development of wasting flaccid paralysis and patchy hypoaesthesia in both legs. He was examined by Dr. L. C. E. Lindon in consultation, and a tumour of the *conus medullaris* was diagnosed. At this time he was thought to have, in addition, bilateral papilloedema, and certainly there was a haemorrhage in the left fundus.

An exploration was thought advisable, and a laminectomy revealed a tumour completely filling the intrathecal space just below the *conus medullaris* and apparently growing from the dura anterior to the roots of the *cauda equina*. It was very vascular and had to be removed in fragments.

A fortnight later, in spite of complete return of sensation to his legs, they were still paralysed. His general condition was poor, and bed sores had appeared. He died two months after operation for removal of the tumour.

Pathological Findings.

Macroscopic.

Three pieces of tissue were received with the following respective measurements: 5.5 by 2.5 by 1.75 centimetres, 3.5 by 1.75 by 0.75 centimetres and 2.0 by 1.5 by 1.5 centimetres. Much of the surface was smooth and composed of low lobulated eminences, but about a third of the surface was rough and crumbly. On section the tumour was mostly dirty white with some areas of haemorrhage. The texture on the whole was firm and slightly gelatinous.

Numerous pieces were embedded in paraffin.

Microscopic.

The tumour varied in composition from areas of dense cellularity to loose sparsely cellular degenerate tissue. In the latter the walls of the vessels were often greatly thickened by acellular hyaline material, which merged with a stroma of pale-staining fibrils loosely arranged in an indefinite faintly eosinophilic matrix and non-staining spaces. Occasional microcystic areas were present, and in these haemosiderin-containing macrophages were often found. Prominent dense hyaline bands of festooned shape ran through these gelatinous areas into the more cellular healthier parts, where the tumour cells were arranged along them at right angles and usually on one side only (Figure I).

In those parts of the tumour easily recognizable as neurilemmomatous (Figure II) the cells had long fibrillary processes and slender elongated nuclei of typical cigar shape, and there was plentiful intercellular fibrillary material. The cells ran in small interwoven bundles in which nuclear palisading was evident. The regimentation of the nuclei formed a serpentine pattern, rather than straight lines, and it was the progressive hyalinization of such areas which probably produced the thick bands referred to above.

In contrast with this tissue were tracts of anaplastic cells, arranged in a syncytial fashion with no stroma (Figure III). The nuclei were pleomorphic and much larger, tending to be round or angular rather than elongated, and there was much mitotic activity (Figure IV). Cells with enormous nuclei and multiple nuclei were not uncommon. Although these tracts of anaplastic cells were often sharply defined from the well-differentiated parts, all stages of transition between the two could be seen (Figure V). Groups of anaplastic cells were to be found also in the degenerate acellular areas, and here some of the thickened vessels were plugged with growth. In the exclusively pleomorphic tissue vessels were usually mere endothelial spaces, and there was less tendency to hyaline thickening.

An interesting observation was the preponderance of the least differentiated cells at the periphery of the tumour and of the degenerated acellular tissue at the centre.

Invasion of the dural fibrous tissue and the walls of large vessels, including arteries, had occurred on the edge of the tumour.

With van Gieson's stain the acellular areas and the hyaline convoluted bands in the cellular tissue, together with the walls of the thickened vessels, were shown to contain much collagen. Treatment with *Scharlach R* revealed very occasional fat-filled macrophages and more frequent small groups of tumour cells containing fat droplets.

Discussion.

The clear division which was usually apparent between the well-differentiated areas of characteristic pattern and the anaplastic parts of the tumour suggests that a malignant change took place in an originally benign neurilemmoma. The degenerate parts of the tumour, with

thickened vessels and liquefied stroma, are very characteristic of the simple neurilemmomata found in all parts of the body.

In the absence of post-mortem examination it might be maintained that the papilledema indicated a malignant cerebral tumour, which may have metastasized by the cerebro-spinal fluid to invade a benign neurilemmoma. However, the malignant parts, although predominantly on the surface, were present to some degree throughout the tumour, being found amongst the largely degenerate areas. This, together with the transition between malignant and characteristic components, makes it more likely that the eye signs, if they were due to a space-occupying lesion, were produced by secondary deposits.

Willis (1948) has stressed the possibility that "malignant properties might be accompanied by loss of nuclear regimentation and other structural features on which the recognition of a neurilemmoma depends". This prediction is shown to be correct by the present case, in which the most anaplastic areas bear no resemblance to a common neurilemmoma. In parts of the body where more rapid growth may be unaccompanied by interference with vital functions (unlike the central nervous system), typically neurilemmomatous portions could soon be overgrown.

Small biopsy specimens have been examined from two other malignant tumours of the *cauda equina* which were thought to be consistent with ependymomata. Both patients developed deposits in the lungs (detected radiologically) and one of these has since died, without an autopsy. In such cases malignant neurilemmoma should now be considered.

Summary.

A malignant neurilemmoma arising in the *cauda equina* of a man, aged sixty years, has been described. Transitional stages between well-differentiated and anaplastic areas were present, but the most malignant parts bore no resemblance to the typical structure of a neurilemmoma.

Acknowledgements.

Thanks are due to Dr. L. C. E. Lindon and Dr. I. B. Jose for permission to publish this report of their case. I am indebted to Professor R. A. Willis for his kindness in examining and commenting on the sections. The photomicrographs were made by Mr. Bonython Fuller from sections prepared by Mr. M. Hansen.

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Legends to Illustrations.

FIGURE I.—Hyaline bands and perpendicularly orientated cells (haematoxylin and eosin stain, $\times 95$).

FIGURE II.—Nuclear regimentation in a well-differentiated portion of the tumour (haematoxylin and eosin stain, $\times 95$).

FIGURE III.—Anaplastic area, with mitotic figures (haematoxylin and eosin stain, $\times 190$).

FIGURE IV.—Anaplastic area, with mitotic figures (haematoxylin and eosin stain, $\times 380$).

FIGURE V.—Various grades of pleomorphism. Small zones of nuclear palisading are present above (haematoxylin and eosin stain, $\times 100$).

Reviews.

Three Men: An Experiment in the Biography of Emotion. By Jean Evans, with an introduction by Gordon W. Allport; 1954. London: Victor Gollancz, Limited. 8" x 5½", pp. 316. Price: 20s. 6d.

This book is as interesting as it is unusual. Its purpose is admirably explained in the introduction by Gordon W. Allport, Professor of Psychology, of Harvard University. It consists in stories, mainly objective, from the lives of three men. Professor Allport has felt the need in his teaching and research for more authentic reports of lives as they are actually lived. The author, Jean Evans, has given him three. The names of the men are fictitious, but their stories are true. Miss Evans has had numerous interviews with her subjects, has read any personal documents which exist, and has checked her own impressions where possible against case records, with physicians, social workers or friends. The three men—"Johnny Rocco", "William Miller" and "Martin Beardson"—present problems which are "central to child and adolescent psychology, and to mental hygiene". As plain stories these are by no means without interest. Professor Allport uses such stories as these in his teaching. He advises that, having read them, the reader should "exercise his own insight, call upon his relevant experience, and make his own predictions". If he does this he will be interested and rewarded.

Proceedings of the Fourth International Congress of the International Society of Hematology: Mar del Plata, Argentina—September 20-27, 1952. Associate editors, F. Jimenez de Asua, William Dameshek and Sol Haberman; advisory editors, Jean Bernard, O. P. Jones, P. Introzzi, Sven Moeschlin and L. M. Tocantins; assistant editors, Gonzalo E. Aponte and Jorge Lajous; 1954. New York: Grune and Stratton. 10" x 7", pp. 486, with 232 illustrations. Price: \$10.00.

The International Society of Hematology met in Mar del Plata, a city of Argentina, in September, 1952. More than 300 hematologists took part, most of them from Latin America, but a good many from Europe, North America and elsewhere. The formal material presented at the meeting has now been published. The principal papers are, for the most part, presented in full. Others appear in abstract form only. Broad subject headings under which papers are grouped include the neuroendocrinological regulation of hematopoiesis and hemostasis, histochemistry and cellular ultra-structure, the aetiology and treatment of the leuchemias, manifestations of radioactivity on hematopoietic organs and hemostasis, polycythemia, the diagnosis and treatment of hemolytic disease and the relationship of immunology to hematology, and hemorrhagic disturbances. Some papers are in English, others are in Spanish, but the Spanish papers have English summaries and vice versa. The table of contents and the subject index are in English.

Developmental Anatomy: A Textbook and Laboratory Manual of Embryology. By Leslie Brainerd Aray, Ph.D., Sc.D., LL.D.; Sixth Edition; 1954. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 10" x 7", pp. 690, with 630 illustrations, some in colour. Price: £4 10s. 3d.

This well-known text-book has not appeared in a new edition for eight years; as a consequence the text has been so extensively revised and rewritten that it now becomes almost a new book.

The approach to the subject is much the same as formerly, with the comparative aspect of embryology receiving frequent mention. There is still too little space given to the developmental changes occurring in post-natal life, and the important subject of congenital cardiac anomalies could have been dealt with more fully.

Clarity of style with emphasis on the main theme is a notable feature of the text, while the rearrangement and shortening of chapters are a definite improvement and more in line with the usual teaching routine; however, one would have expected the chapter on reproductive cycles (a well-balanced account) to precede rather than follow that on implantation and placentation.

The claim to have reviewed world literature since 1946 seems justified and there is more than the usual reference to work done outside America. Prader's work on the development of vertebrae seems to have been overlooked.

The laboratory manual for use in the study of chick and pig embryos is retained with little change.

The illustrations consist mainly of line and half-tone diagrams. Many new ones have been added. In general they are clear and have the virtue of not including too much detail in any one diagram. Colour is used sparingly, perhaps too sparingly, while there appears to be an undue proportion of diagrams of very rare congenital anomalies.

The author's energy and skill in preparing this edition have successfully brought it up to date and "Arej" remains in the forefront of text-books of embryology.

Diseases of the Skin: For Practitioners and Students. By George Clinton Andrews, M.D., F.A.C.P.; Fourth Edition; 1954. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 10" x 6½", pp. 588, with 777 illustrations. Price: £6 3s. 6d.

The fourth edition of Andrews's book will be welcomed by dermatologists. Since the publication of the third edition in 1946 many new treatments have been introduced and these have been included in this volume. Outmoded lines of treatment have been omitted. For instance, penicillin is the therapy mentioned in the treatment of syphilis irrespective of the stage. Supplementary treatment with arsenic or bismuth does not increase the good results, and is of no value. In various conditions, in which the author considers it indicated, cortisone, ACTH and hydrocortisone are mentioned and their mode of administration is given. *Lupus erythematosus*, *dermatomyositis*, *scleroderma* and *periarteritis nodosa* are grouped under collagen diseases after the classification of Klemperer. In the treatment of *syccosis barbae*, *furunculosis* and *impetigo contagiosa* antibiotic ointment is to be applied locally, but no mention is made of which antibiotic, nor is any mention made of the high incidence of sensitization occurring with penicillin ointment. Again antibiotic ointments are mentioned in the treatment of *neurodermatitis circumscripta*, but no warning is given about the possibility of the occurrence of cutaneous sensitivity to these substances. The illustrations are numerous and excellent, and the quality of the paper is very good. This book can be thoroughly recommended to the practising dermatologist and the general practitioner.

The Year Book of General Surgery (1954-1955 Year Book Series). Edited by Everts A. Graham, A.B., M.D., with a section on Anesthesia edited by Stuart C. Cullen, M.D.; 1954. Chicago: The Year Book Publishers, Incorporated. 8" x 5½", pp. 500, with 131 illustrations. Price: \$6 90.

In a short introduction to this Year Book, the editor comments upon the complaint made that American writers in their bibliographies often neglect the medical literature of countries other than their own. The breadth of outlook shown in the editorial comment is refreshing and fitting for the editor of a review of current literature. The worldwide character of the literature abstracted in the Year Book shows that he practises what he preaches. Special subjects to which chapters are devoted include shock, fluids and electrolytes, nutrition, wounds and wound healing, antibiotics, neoplasms, hypertension and hernia. Otherwise the abstracts are grouped according to anatomical regions or systems. Editorial comment is brief but helpful and to the point. A special subsection on anaesthesia has chapters on narcotics and antagonists, barbiturates and antagonists, ventilation, circulation, inhalation anaesthesia, muscle relaxants, infiltration and regional anaesthesia, spinal anaesthesia and hypothermia. The volume will be of interest to a wide circle of medical readers. Its production is, as usual, above reproach.

Notes on Books, Current Journals and New Appliances.

Family Doctor. Published monthly by the proprietors, the British Medical Association, Tavistock Square, London, E.C.1. Sole agents for Australia and New Zealand: Gordon and Gotch (Australia), Limited. Subscriptions for twelve months: 20s. (sterling), including postage.

The latest two issues of *Family Doctor* are as attractive and as informative as ever. The December issue naturally has an emphasis on Christmas, particularly from the children's point of view, with some interesting recipes and a thoughtful discussion on how to avoid undesirable complications of the season. Other articles deal with dreams and nightmares, taking care of a child's skin, coughs and colds, self-reliance, pets and word-blindness. The January

issue starts with a charming article on wishes by John Steinbeck. In another stimulating article a woman doctor with poliomyelitis tells how she lives happily, and Dr. W. C. Alvarez writes in his well-known manner on how to live with your heart. Other subjects of articles are getting up in the morning, fright and the child, care of the teeth, the shy child at the party, keeping house in hospital and thumb sucking. Regular features continued in both these issues include J. Gordon Cook's science notes, Joanna Perry's account of bringing up baby Matthew, letters to an expectant mother, cooking and answers to questions.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Explored Areas of Arthropod-Borne Viral Infections (Yellow Fever and Dengue Excepted): Basic Sources"; 1954. New York: The American Geographical Society. 2' 8" x 1' 10".

Many bibliographical references are printed on the back of the map.

"Medicine in its Human Setting: Being Clinical Stories for Students, Nurses and Practitioners", by A. E. Clark-Kennedy, M.D., F.R.C.P.; 1954. London: Faber and Faber, Limited. 8" x 5½", pp. 276, with 38 illustrations. Price: 13s. 6d.

Twenty-two short stories setting forth the human side of medicine.

"Clinical Endocrinology for Practitioners and Students", by Laurence Martin, M.D. (Camb.), F.R.C.P. (London), and Martin Hynes, M.D. (Camb.), M.R.C.P. (London), with a foreword by Lionel Whitby, C.V.O., M.C., M.D., F.R.C.P., D.P.H.; Second Edition; 1954. London: J. and A. Churchill, Limited. 9" x 5½", pp. 262, with 39 illustrations. Price: 20s.

Intended for practitioners and students to present endocrine disease from the point of view of the general physician.

"Genetica Medica: First International Symposium on Medical Genetics, September 6-7, 1953" directed by Luigi Gedda; 1954. Rome: Edizioni Dell'Istituto Gregorio Mendel. 8½" x 6½", pp. 490, with 177 illustrations. Price: L.5000.

The languages used throughout are French, English, Italian and German. Some papers appear in one language, others in another; summaries in the other three languages are given.

"Haematological Technique for Medical Laboratory Technicians and Medical Students", by E. M. Darmady, M.A., M.D. (Camb.), F.R.C.P., and S. G. T. Davenport, F.I.M.L.T.; 1954. London: J. and A. Churchill, Limited. 10" x 6½", pp. 206, with 27 illustrations, four in colour. Price: 18s.

Intended not only for technicians and medical students, but also for potential pathologists.

"Fluid Therapy", by James D. Hardy, M.S. (Chem.), M.D., F.A.C.S.; 1954. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9½" x 6½", pp. 256, with 77 illustrations. Price: 59s. 3d.

The author states that, in the writing of this book, his "guiding philosophy has been to fuse fundamental physiologic information with the therapy which such information logically requires".

"The Skin: A Clinicopathologic Treatise", by Arthur C. Allen, M.D.; 1954. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical), Limited. 11½" x 9", pp. 1064, with 495 illustrations. Price: £13 2s. 6d.

The author is a pathologist who discusses dermatological conditions largely but not solely from the pathological point of view.

"Local Analgesia: Brachial Plexus", by R. R. Macintosh, M.A., D.M., F.R.C.S., F.F.A.R.C.S., D.A., M.D. (hon. causa) (Buenos Aires and Aix-Marseilles), and William W. Mushin, M.A., M.B., B.S. (London), M.R.C.S., F.F.A.R.C.S., D.A.; Third Edition; 1954. Edinburgh and London: E. and S. Livingstone. 7½" x 5", pp. 62, with 32 illustrations. Price: 10s. 6d.

The main instruction is conveyed by pictures rather than by the written word.

The Medical Journal of Australia

SATURDAY, FEBRUARY 12, 1955.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE SCIENCE AND ART OF UROLOGY.

UROLOGY, perhaps more than any other branch of medicine and surgery, is a good example of the combination of art and science. No surgeon worthy of the name can nowadays regard his work as the performance of so many operations set out on a list drawn up for him by his house surgeon. In such an attitude lies justification for the title "human carpenter" bestowed on some men. In other words, there is a world of difference between a surgeon and an operator. It has been said that a surgeon should have the mind of a physician, which is another way of saying that he should be concerned with why and how as well as with what to do and how to do it. Perhaps from an unconscious endeavour to emphasize this attitude, the specialty is called urology and not urological surgery, and those who practise it prefer to be known as urologists and not urological surgeons.

Almost the whole of this issue has been devoted to the papers and discussions from the annual meeting of the Urological Society of Australasia held at Sydney in April, 1954. This has been done in pursuance of our policy, first of all to make the journal useful to members of special societies who wish to produce their papers and discussions in one medium, and secondly to allow members to learn what is happening among Australian specialists and to take an intelligent interest in these doings—specialists are not the only members of the profession who wish or need to know how and why. The papers are of a high standard. They show what most of us know, that urology is intimately bound up with pathology, radiology and the basic sciences. Perhaps the most important lesson carried by them is the need for care and thoroughness.

The Society was fortunate in having as its visitor Professor R. W. Barnes, of Los Angeles. His study of 251 cases in which patients have been operated on for tumours of the bladder is remarkable. It is a pity that the Australian hospital statistics produced by Dr. L. D. Wheeler were not submitted for publication. The figures cannot have been too heartening, for it will be noted that Dr. Keith Kirkland said that they "pointed to the gloomy position that existed at the present time in dealing with cancer of the bladder in this country". Perhaps this is why Dr. Wheeler's contribution was withheld. The anatomical studies of Tracy Powell, referred to by Dr. Kirkland, are important, but not more important than the Broders classification mentioned by Dr. Barnes. The classification of Broders was not used in all Dr. Barnes's cases, but the degree of invasion was noted in almost all. That 245 of the 251 patients were treated by conservative rather than radical operation is understandable. Perhaps this should be expressed in another way, that what is understandable is the fact that radical surgery was not used. At the same time we must note the view expressed by Dr. H. Pearson that, despite poor statistics, there is still a place for radical surgery, and the contention of Dr. H. H. Mortensen that, from the palliative point of view, it has a definite place in the treatment of tumours of the bladder. What we must await is the discovery of some new chemotherapeutic agent which will by oral or parenteral administration prevent infection of the upper part of the renal tract after implantation of the ureters into the large bowel. The whole subject was given a different point of view by Dr. E. W. Frecker, who was a visitor to the Society and spoke as a radiotherapist. Put shortly, his contention is that the treatment of carcinomata of the bladder is undergoing the same evolution as that which during the last few decades has marked treatment of carcinoma of the mouth. The heroic and extensive removal of tissue from the mouth and neck which used to be common a few decades ago is not now the method of election. Admittedly there were some successes, but the disfigurement of the patient, to say nothing of his suffering, were factors in the development of radiotherapy in oral cancer. The long-term results have proved the value of irradiation and have relegated surgery to second place. Dr. Frecker quotes results obtained by Paterson of Manchester, who holds that radiotherapy is the treatment of choice for all carcinomata of the bladder. The rate of cure quoted by Dr. Frecker was 55%. In the discussion, Dr. Barnes doubted whether the patients had been followed long enough and insisted that a survival of at least five to ten years should be quoted. Dr. Frecker replied that Paterson's figures covered a five-year survival period. He pointed out that Paterson "received cases *de novo*" and he thought that the only real figures were of that variety, not the results of "discards". Dr. Frecker is probably right in his contention that the place of X-ray therapy in malignant disease of the bladder will increase. Time will show whether he is right.

Dr. V. S. Howarth's paper on immediate prostatectomy and the discussion which followed it should be read with care. Dr. Barnes commended Dr. Howarth for his courage in presenting a paper on so controversial a subject; the discussion showed that he was justified. Dr. Earlam said that Dr. Howarth had placed the immediate operation in the proper perspective. It is important to note that

Dr. Howarth found that there were 24 in every hundred patients admitted to hospital with acute retention of urine due to hypertrophy of the prostate on whom the operation could not be performed. Among the remainder the mortality rate was as low as 4%. It will be noted that Dr. Earlam was not prepared to accept a mortality rate of 3% reported by Wells when every one of 205 consecutive patients was subjected to this operation. He also declared that many urologists dazzled themselves with science wrongly applied and that they had convinced themselves that at times they could save a patient from uræmia only by inflicting on him a premature infection of his urinary tract. In other words, he joined Wilson Hey and Wells in "debunking" the long accepted approach to prostatic surgery. Urologists will have to find their own road to salvation in this matter, but they must not continue to accept without question all that they have learned from their predecessors.

At the outset reference was made to science and art as bound up together in the practice of urology. This is undoubtedly true. We have only to recall the renal function tests and their application to urological problems, the tests associated with the non-protein nitrogenous constituents of the blood and other laboratory procedures to realize that "carpentry" as such has no place in the practice of a urologist. The two papers on two aspects of acute renal failure proclaim science as handmaid to the art of urology. If we court the handmaid in the matter of prevention of urological disorders, we may be able to dispense with some of the display shown in practice of the art.

Current Comment.

THE PATHOLOGICAL RESPONSE OF RENAL TUBERCULOSIS TO CHEMOTHERAPY.

NUMEROUS reports have been published recording the clinical response of renal tuberculosis to chemotherapeutic agents used individually and in combination. These have helped in determining the role of these drugs in treatment, but have not contributed a great deal towards understanding the rationale of that treatment. An understanding of the question has been better served by the pathological investigations that have been carried out in Glasgow by John C. Dick, who in his latest paper¹ records a comparison of the effect of two therapeutic combinations on tuberculous lesions of the kidneys. These combinations were streptomycin *plus* PAS and streptomycin *plus* isoniazid. In previous work to which he refers in this paper, Dick showed that after treatment with streptomycin alone fibrosis and regression were observed in the lesions, and after treatment with isoniazid alone increased vascularity, hæmorrhages, absorption of caseation and loosening of fibrosis were observed. In a proportion of cases, however, both types of effect were reversed, and acute spreading lesions recurred. In another investigation involving the treatment of acute lesions of miliary tuberculosis and tuberculous meningitis it was found that streptomycin *plus* PAS induced regressive changes with much fibrosis, whereas streptomycin *plus* isoniazid induced absorption of lesions and very little fibrosis. Dick states that if after combined chemotherapy these changes are also found in the variety of lesions met with in renal tuberculosis, they will probably apply to all tuberculous lesions under such treatment except where physical considerations are also concerned—for example, in tension cavities of the lungs.

The present paper pursues this question. Advantage was taken of the fact that in some stages of renal tuberculosis, while both surgery and chemotherapy are required for treatment, it is immaterial to the patient at which stage of chemotherapy the diseased kidney is removed. It was thus possible to obtain kidneys or portions of kidneys for examination from patients who had undergone combined chemotherapy in the standard dosages up to periods of six months. A comparison is made between the histological appearances of lesions in 25 specimens from patients treated with streptomycin (one gramme daily) *plus* PAS (20 grammes daily) and those in 25 specimens from patients treated with streptomycin (one gramme daily) *plus* isoniazid (200 milligrammes daily). As controls, 46 specimens were examined from patients who had had no specific drug treatment. It was found that both combinations of drugs checked the progress of all acute lesions in these tuberculous kidneys. Dick points out that this did not mean that the excretion of tubercle bacilli should stop immediately, for other factors besides the presence of acutely caseating lesions could cause such excretion. He outlined some of these factors to show that the presence of tubercle bacilli in the urine does not necessarily mean that there are still actively progressive lesions in the kidney. It was found that the main effect of the combination of streptomycin and PAS on tuberculous lesions was to encourage fibrosis. This fibrosis was as intense as that occurring in normal regression of the lesions, but it took place in all lesions at the same time and was not subject to vagaries of local immunity and defence. It was the same effect as Dick has previously recorded when streptomycin was used alone; but this time drug resistance did not develop, and it is suggested that this effect is, in fact, the anti-tuberculous effect of streptomycin. The main effect of streptomycin *plus* isoniazid, on the other hand, was to induce resolution, complete in recent lesions and not so complete in older lesions. This was almost the same as the effect of isoniazid alone, also previously reported by Dick, without the reactivation of lesions occasioned by the development of drug resistance. The anti-tuberculous effect of isoniazid predominated over that of streptomycin, but streptomycin had an important though slight modifying result, in that there were fewer hæmorrhages into areas of caseation than were observed after treatment with isoniazid alone.

Dick goes on to state that the difference in the effect of the two main anti-tuberculous drugs, streptomycin and isoniazid, rested mainly on their different effect on the epithelioid cells and on the development of fibrosis. Streptomycin was not effective enough to enable the epithelioid cells to revert to the monocyte form and to be absorbed, with the result that fibrosis developed; nor did it allow full epithelial regeneration, increased vascularity or absorption of caseation. The effect produced by isoniazid did enable reversion of the epithelioid cells to monocyte form and their subsequent absorption to take place, with the result that fibrosis did not develop. Epithelial regeneration was greatly increased and caseation was absorbed with the formation of vascular granulation tissue and minimal fibrosis, but giant cells were apparently not affected. Isoniazid was thus much more penetrative than streptomycin, not only against the tubercle bacilli themselves but also against the lesions they caused.

Dick refers to certain of the reports made to the Medical Research Council by their Tuberculosis Chemotherapy Trials Committee, in which an account is given of the effect of isoniazid, streptomycin and PAS in various combinations in the treatment of pulmonary tuberculosis.² He considers that the histologically observed difference between the effect of streptomycin *plus* PAS and the effect of streptomycin *plus* isoniazid on tuberculous lesions explains the differences found clinically when these drugs were used in the treatment of pulmonary tuberculosis. With both pairs of drugs all acute lesions were checked, and thus the patients gained a great deal of weight; but strepto-

¹ *Lancet*, September 11, 1954.

² *Brit. M. J.*, March 7, 1953, and November 7, 1953.

mycin plus isoniazid induced more healing, so there was greater gain in weight than with streptomycin plus PAS.

Dick states that in the management of acute lesions two opposing points must be reconciled as far as possible. The first is that the sooner treatment with the combination including isoniazid is started the more chance there is of complete healing. The second is that diagnosis should be fully established before such treatment is begun, as retrospective diagnosis, even by biopsy, may be impossible. It must be remembered also that even when the presenting lesions in the kidneys are acute there are nearly always other more chronic lesions elsewhere in the body and suitable surveillance afterwards is required. In the management of chronic lesions the presence of dense fibrosis is a barrier no drug can be expected to overcome completely. The action of isoniazid in loosening the fibrous tissue, attempting to desquamate necrotic material into the cavity, and encouraging the growth of a new epithelial lining seems more satisfactory than the action of streptomycin. This loosening of the fibrosis will produce improvement in the appearance of lesions as seen radiographically. At the same time, Dick stresses that there may still be caseated material in such cavities and that tubercle bacilli have been seen in such material after at least four months' treatment with streptomycin plus isoniazid. However, the final evidence on the effect of isoniazid on the bacilli in these lesions will come not from histological but from "biological" sources, by which Dick means, for example, a clinical review of patients ten years after treatment. He states that evidence that bacilli may survive three months' treatment with streptomycin plus PAS and cause extension of lesions is already present in some specimens of his series. The other factor delaying healing in chronic cases was found to be secondary pyogenic infection. In a great majority of cases this was subclinical and unsuspected. Dick comments that these barriers to complete healing of chronic lesions confirm the view that surgery is still required in the management of renal tuberculosis—either partial or total nephrectomy, depending on the extent of the lesions. The time during chemotherapy at which operation is performed does not matter so long as treatment is continued afterwards for some time. Three months' chemotherapy with an isoniazid combination will enable healing to take place of all uncomplicated recent lesions. Chronic and infected lesions do not heal completely, and little further improvement occurs towards the end of six months' treatment.

There will be little disagreement with the view that the best results in the treatment of renal tuberculosis are to be obtained from combined treatment with surgery and chemotherapy, though the details are not settled. Dick's findings are of major importance, but the clinicians sometimes have another view to put. Some of the difficulties experienced by the clinicians in the use of chemotherapy for renal tuberculosis were recorded along with the good points in a previous discussion in these columns.¹ Emphasis may perhaps be placed with advantage on the statement recently made by J. Cosbie Ross, J. G. Gow and C. A. St. Hill² that there is no place in the treatment of genito-urinary tuberculosis for prolonged administration of a single drug. They also consider that the intermittent method of therapy offers great advantages and that a course of treatment should be continued for as long as a year and even longer. From an experience with 240 patients suffering from genito-urinary tuberculosis they advocate a regime of chemotherapy, surgery and sanatorium treatment. They are emphatic in the view that surgery is as necessary today as before the advent of chemotherapy. In fact, they point out, surgical measures will remain necessary as long as resistant strains continue and as long as chemotherapy fails to produce radiographic healing of an ulcerocavernous lesion. They advise, however, that operative treatment should not be begun until the patient has had an adequate period of chemotherapy; this will ensure smooth convalescence, and, more important, will enable wounds to heal by first intention. In their experience, this "staging" of surgical measures carried

out under a screen of chemotherapy has almost eliminated the breaking down of nephrectomy wounds of previous years.

It is encouraging to note Ross, Gow and St. Hill's statement about the mortality associated with genito-urinary tuberculosis. During the first half of this century when surgical treatment was used with or without a sanatorium regime, a mortality of approximately 50% was recorded. The addition of chemotherapy to make a triad of treatment has reduced the mortality to 10%, and the figure is being improved year by year.

DIETS WITH A HIGH PROTEIN CONTENT IN THE NEPHROTIC SYNDROME.

DIETS with a high protein content have been used in the treatment of the nephrotic syndrome since Epstein reported clinical improvement with daily intakes of 150 to 200 grammes. Few quantitative studies of the effects of such diets have been reported, and in many cases of nephrotic oedema little clinical improvement has followed a rise of dietary protein. To determine the effects of various protein intakes, J. D. Blainey¹ has made a very detailed examination of three patients with the nephrotic syndrome. At each level of intake the nitrogen balance was measured, the concentrations of serum protein fractions were determined after electrophoretic separation on paper and the clinical state of the patient was assessed, with particular reference to changes in body weight and oedema. At the same time the excretion of protein and non-protein nitrogen in the urine was studied in detail, with determinations of the daily loss of urea, ammonia, creatinine and other non-protein nitrogen, at different protein intakes. The three patients showed the typical features of the nephrotic syndrome, namely, oedema due to the low colloidal osmotic pressure which results from hypoproteinaemia, hypercholesterolaemia and proteinuria. In "J.R." the syndrome was uncomplicated; in "G.M." there was subacute nephritis; and "H.C." had bilateral renal vein thrombosis revealed at autopsy. The normal human subject has been shown to be in nitrogen equilibrium on a dietary protein intake of 70 to 100 grammes per day, or 0.18 to 0.22 gramme of nitrogen per kilogram per day for a 70-kilogram subject. Increase of protein intake above this level results in a rise of urinary nitrogen within a few days and there is no appreciable extra nitrogen retention. Reduction of intake, for example, in starvation, is followed by a fall in the urinary non-protein nitrogen content, and nitrogen balance can be maintained with lower protein intakes. The three patients were in strongly positive nitrogen balance for many weeks, with nitrogen intakes above 0.2 gramme per kilogram per day for "J.R." and "H.C." and 0.4 gramme per kilogram per day for "G.M." The presence of the sustained positive nitrogen balances and the low nitrogen requirements for equilibrium shown by all provided evidence of severe body protein depletion in the nephrotic syndrome. Other patients, studied in less detail, showed similar results. Depletion of the body stores of nitrogen is accompanied by a rise in the non-protein nitrogen excretion in the urine and an increased level of intake must be given to maintain a high positive balance. There was no evidence in any of the cases of a decrease in the positive nitrogen balance with diets with a very high protein content, that is up to 200 grammes per day of protein. In the adult patient it is difficult to keep up this amount for long periods. Unfortunately, in these experiments increase in dietary protein was accompanied by increase in the caloric value above that due to protein alone. This made interpretation difficult.

The three patients at the beginning of the treatment had a low daily urea excretion, similar to that seen in prolonged protein starvation. In the normal person, rise of urine non-protein nitrogen content on diets with a high protein content is almost completely accounted for by a rise in the urea and ammonia nitrogen content. The

¹ M. J. AUSTRALIA, February 20, 1954.

² *Lancet*, January 15, 1955.

¹ *Clin. Sc.*, November, 1954.

remaining non-protein nitrogen, which consists mainly of creatinine, uric acid and other purines and amino acids, remains nearly constant over a wide range of nitrogen intakes. In "J.R." the increase in urinary non-protein nitrogen with increased nitrogen intake was not accounted for by rise in the urea nitrogen level and there was a considerable aminoaciduria. In the other two patients there was only a slight rise in amino acid excretion. The patient "J.R." had also a persistent glycosuria, although the blood levels of both glucose and amino acids were within the normal range. Similar findings have been observed in another patient with the nephrotic syndrome and they have been considered as evidence of tubular reabsorptive defects. The nitrogen balance studies in the three cases described and in several other less complete studies has demonstrated clearly the need to continue as high a protein intake as the patient can tolerate for many weeks in the treatment of the nephrotic syndrome. There has been a tendency to abandon high protein feeding since clinical improvement and rise of the serum protein concentration is frequently very slow. In all three patients the serum protein concentration rose slightly during the course of the balance studies and there was marked clinical improvement in two. It is concluded from these studies that in cases of severe, prolonged proteinuria diets with a high protein content offer a valuable form of treatment, the progress of which can be assessed by simple nitrogen balance studies and by observation of the daily urinary urea excretion.

CUSHING'S SYNDROME.

When Harvey Cushing, in 1932, described the syndrome which bears his name he attributed it to the occurrence of basophile adenomata of the pituitary body. He realized that many questions in regard to the syndrome remained unanswered and he expressed the opinion that no doubt an answer would in time be forthcoming. Cushing's view of the syndrome, which he called pituitary basophilism, is no longer tenable. R. A. Willis¹ points out that the syndrome itself is very variable and often imperfectly manifested by patients with basophile adenomata. He adds that identical syndromes are found in patients with adrenal cortical tumours and without pituitary adenomata. And so while it is true that basophile adenomata of the pituitary are found in many cases in which the symptoms of Cushing's syndrome are present, all these symptoms cannot be directly attributed to hypersecretion of the basophile cells. Willis states that it is probable that the condition is a polyglandular disturbance in which both pituitary and adrenal glands are implicated. This is the view commonly held. It should perhaps be recalled that in 1932 Cushing wrote as follows:²

... if further study should prove that adrenal tumors in the absence of any demonstrable change in the pituitary body may cause a polyglandular syndrome in many respects similar to that under discussion, it may well enough be assumed that, when the same features characterize the syndrome of a basophil adenoma, they in all probability are secondarily ascribable to a hypersecretory influence of adrenal cortex, even in the absence of any histological appreciable abnormality. . . .

Those who are interested in the nature of Cushing's syndrome are reminded of the work of A. C. Crooke and of Peter Heinbecker, both of whom were mentioned in our discussion of this subject in February, 1945. Crooke described changes in the basophile cells of the pituitary gland common to conditions which exhibit the syndrome attributed to basophile adenomata. Heinbecker tried to link up the changes described by Crooke with tumours of the adrenal cortex. He thought that at least three primary lesions, a tumour of the adrenal cortex, a tumour of the thymus and an atrophy of the nuclei of the hypothalamus, were probable precursors of the hyalinization of the

pituitary cells described by Crooke. In a recent discussion on the treatment of Cushing's syndrome,³ P. M. F. Bishop, F. M. Glover, R. R. de Mowbray and M. G. Thorne have stated that whatever the ultimate aetiology of the syndrome is proved to be, it is commonly agreed that its immediate cause is overactivity of the adrenal cortex resulting either from an adreno-cortical tumour or from hyperplasia. Removal of adrenal tissue is, in their opinion therefore, a logical method of treatment. They report the result of the treatment of 21 patients at Guy's Hospital by irradiation of the pituitary gland or by subtotal adrenalectomy. Seventeen patients were treated with deep X-ray therapy of the pituitary gland. As five of these were also operated on, the effect of radiotherapy cannot be easily assessed. Of the twelve patients not operated on, four showed a somewhat improved condition and were still alive. On the other hand, eight patients, including six men, did not benefit from the treatment and seven of them had died. Subtotal adrenalectomy was performed on six patients. One of these had previously failed to respond to radiotherapy, and two others had received radiotherapy after the first stage of their operation. All subsequently lost weight and improved in bodily configuration and in their skin lesions. In five women of the group the blood pressure was lowered and the hirsutism became less and there was a return of normal menstrual cycles in three of the four who had amenorrhoea. There was also an improvement in the psychological state of three patients who were previously either depressed or psychotic. The sixth and only male patient in this group manifested signs of considerable renal damage and he died two months after operation as an indirect result of hypertension which had not responded to adrenalectomy. In the same issue of *The Lancet* there is a report of six patients suffering from Cushing's syndrome who were treated surgically. The report comes from R. N. Beck, D. A. D. Montgomery and R. B. Welbourn. Four of the six patients operated on have been followed up since operation for seven to thirteen months. In all four there has been a striking return to normal of bodily configuration, strength and energy. Further details need not be given. The last two patients of the six have been operated on more recently and it was not possible to assess the result. It should be explained that the post-operative treatment involved the use of cortisone, and when this did not produce the desired result, of nor-adrenaline.

Reference to "The Medical Annual" for 1954 reveals that interesting reports have appeared from other authors. Von W. Falk investigated three cases of Cushing's syndrome in children and obtained striking success in one child by removal of a histologically normal adrenal gland. Grob *et alii* have reported the case of a four-year-old girl whose symptoms appeared at the end of her first year. At the age of four, complete cure was obtained by the extirpation of an adreno-cortical carcinoma. Most interesting is the report of the successful treatment of a patient with Cushing's syndrome by electrocoagulation of the hypophysis. This has been reported by B. Arner *et alii*. The patient manifested a typical and advanced form of the syndrome and was twenty-four years of age. After electrocoagulation, the symptoms disappeared completely within two months and the patient, a female, was still healthy nineteen months after operation. The electrocoagulation did not cause complete destruction of the pituitary gland, since the gonads, thyroid and adrenals continued to show normal function, and pregnancy occurred fourteen months after operation.

Finally, attention should be drawn to an attempt which has been made at the University of Liverpool, England,⁴ to use D.D.D. therapy in Cushing's syndrome. D.D.D. is an insecticide related to D.D.T. When used experimentally on dogs, D.D.D. produces severe atrophy and loss of function of the deeper layers of the adrenal cortex. H. L. Sheehan, V. K. Summers and John Nichols made an attempt to reproduce this renal atrophy in a patient suffering from Cushing's syndrome. The patient was a woman and she was given a total dosage of 127 grammes

¹ "The Pathology of Tumours", 1948, page 626.

² "Papers Relating to the Pituitary Body, Hypothalamus and Parasympathetic Nervous System", 1932, chapter 3; quoted in *THE MEDICAL JOURNAL OF AUSTRALIA*, February 3, 1945, page 116.

³ *Lancet*, December 4, 1954.

⁴ *Lancet*, February 14, 1953, page 312.

of the substance in three courses of treatment. No recognizable clinical, biochemical or histological response was obtained. Biopsies of fat and adrenal gland showed that D.D.D. was taken up by these tissues in the human patient in amounts comparable to those in the dog. The conclusion reached was that the sensitivity of the human adrenal gland to D.D.D. did not appear to be due to any failure of the substance to accumulate there. Such work as this suggests that we may yet find some substance which will be effective in the treatment of Cushing's syndrome so that operation may be avoided.

MEDICAL EDUCATION IN ISRAEL

ISRAEL has a policy of uncontrolled (Jewish) immigration. In the Declaration of Independence of May 14, 1948, it is explicitly stated that "the State of Israel will be open to the immigration of Jews from all countries of their dispersion". As a result of this policy, immigration has been on an unprecedented scale. The Jewish population, which numbered 650,000 in May, 1948, in the subsequent five years absorbed some 750,000 new immigrants (35% from Asia, 15% from North Africa and 49% from Europe). These figures are quoted by M. Prywes¹ in a description of the steps being taken to meet the medical needs of this rapidly growing State. The health problems are formidable. Prywes states that most immigrants come to Israel with no means of their own, and many are in need of special care because of poor health, because of age or for other reasons. A considerable number are suffering from chronic diseases. Of the community of the Yemenite Jews, numbering 47,000, who were transferred to Israel by air in the course of one year, 16,000 were in need of hospital treatment on arrival. About 20,000 cases of schistosomiasis have been imported with immigrants from Yemen and Iraq. Of the immigrants from North Africa, 60% are afflicted with trachoma. The large number of tuberculous patients among the new arrivals compelled the State to increase the number of tuberculosis hospital beds from 590 in 1949 to 1986 by the end of 1952. The transfer of whole communities from Asia and North Africa caused the infant mortality rate to rise from 29 per thousand in 1947 to 51 per thousand in 1949. As a result of intensified activities in this field the rate dropped to 39 per thousand in 1951. Finally, the mental and social adjustment of all these heterogeneous groups ("a gap of eight centuries separates the immigrant from Western Europe from his contemporary from the Yemen") constitutes in itself a gigantic medico-social task. In addition to this, a major problem of medical organization is raised by the developmental policy of the country, particularly the establishment of rural settlements in areas far from towns and main roads, and sometimes far out in the desert.

A system of "socialized" medicine, mostly through some form of health insurance, provides medical care for every citizen of the country, and this necessitates a vast network of services and the employment of a great number of medical workers. Prywes states that Israel spends more money *per capita* for medical care than England. In 1953 the number of medical practitioners in Israel was 3317, and the doctor-population ratio (1 in 430) was one of the highest in the world (the Australian figure is approximately 1 in 1000). However, many of the doctors are nearing retirement age, and others must take their place. With the destruction of Jewish communities in Europe in World War II, the greatest source of Israel's supply of highly qualified Jewish physicians was dried up, and it has become the task of Israel's own medical school to fill the gap. This school, which was opened in May, 1949, is the fruit of twenty-five years' planning and work. The first step was the endowment in 1924 of an institute of microbiology at the Hebrew University in Jerusalem by the American-Jewish Physicians' Committee. In 1927 a plan was put forward for a post-graduate school of medicine in conjunction with the Rothschild-Hadassah Hospital in Jerusalem. In 1936 it was agreed to establish the University-Hadassah Medical Centre on Mount Scopus

(just outside the city of Jerusalem) with three units: the Medical School for Postgraduate Study and Research, the Rothschild-Hadassah University Hospital and the Hadassah School of Nursing. The Hadassah Hospital, which has left a favourable memory in the minds of many medical officers who served in the Middle East during the second World War, was given the status of a university institution in 1939. In the same year, on the completion of the Medical Centre, the pre-faculty of medicine was organized with the uniting of the medical research laboratories of the university and various clinical departments of Hadassah. In 1947 everything was ready for the inauguration of the medical school in the following year with the opening of the first pre-medical course; the plan was to build up the full curriculum step by step during the next few years. However, during the War of Independence when the Arab forces gained control of the road leading to Mount Scopus, the further development of the Medical Centre could not be continued according to plans. The Centre was evacuated from its large new quarters and transferred to provisional premises in various buildings in Jewish Jerusalem, none of which were suitable for the needs of a modern medical school. The Hadassah Hospital continued to function and even expanded. It now has a bed capacity of 500 and an out-patient attendance of approximately 200,000 patients a year. In May, 1949, the Medical School was opened, and undergraduate medical teaching was begun with the opening of the second pre-clinical year (fourth year of studies). Since the academic year 1952-1953 a full six-year course has been available. The final examinations are held at the end of the sixth year, but students must then spend a year in residence in a hospital and present a thesis, after which they obtain the degree of doctor of medicine. Graduates from the Medical School numbered 84 in 1952 and 51 in 1953. The economic situation of the students in general is stated to be precarious, and most of them are compelled to work, although assistance is made available in many cases from both inside and outside Israel. In the teaching programme, laboratory work, bedside teaching and clinical clerkship are emphasized. Little time is devoted to lectures. Instruction is given in Hebrew, sufficient knowledge of which is a prerequisite for admission. Recently a school of dentistry and a school of pharmacy have been opened within the framework of the Medical School. Research work is carried on in the pre-clinical departments in the University Hospital and in a number of laboratories.

Post-graduate training for doctors is still in the initial stage of planning, but refresher courses have been conducted occasionally. Much thought is being given to the question of post-graduate training and to the part that it must play in the development of an adequate medical service. Prywes states that the Medical School takes special interest in this, being well aware that its teaching and research staff will have to be recruited mainly from the ranks of local men. It believes that young doctors ought to receive at least the initial part of their post-graduate training in the country so as to become acquainted with the physical and psychological needs of the community they will serve. This also is the reason why graduates are not permitted to serve their year of internship abroad, since the School is convinced that they should first of all be integrated into the medical life of the country, understand its specific conditions and requirements and realize the importance of their mission before they can withstand the impact of conditions abroad and the temptation of an easier career.

A significant recent development was the laying of the cornerstone for the permanent home of the new medical centre in Jerusalem in June, 1952. The centre is to include a complete 430-bed teaching hospital equipped with modern facilities and labour-saving devices, an undergraduate school for 125 students, clinical and pre-clinical research laboratories, an out-patient department, a nurses' training school and training facilities for ancillary personnel. It is described as an ambitious project, but it will occupy the key position in plans to meet the medical needs of a young and progressive country, and its growth will be watched with sympathy by many doctors and others far outside the boundaries of Israel.

¹ *New England J. Med.*, October 7, 1954.

Abstracts from Medical Literature.

DERMATOLOGY.

Acne Comedones Due to Paraffin Oil.

C. BERLIN (*Arch. Dermat. & Syph.*, June, 1954) states that *acne neonatorum* can be partially explained on a hormonal basis. Perlman described two infants, aged one week and three months, respectively, with typical *acne vulgaris* associated with *mastitis neonatorum*. However, in children older than one year, in whom the maternal and their own sex hormones are naturally not active, the sometimes observable acne must be provoked by other factors. English writers have described acne in children caused by using camphorated oil. Recently, the author had the opportunity to observe a number of children with an acneform eruption on the face. An epidemic outbreak of an acneform eruption is described which occurred in 26 children of a collective agricultural settlement—16 boys and 10 girls, aged two years to ten years. The eruption was located on the face and was characterized by miliary comedos, which often showed grouping, and occasional acne papules and pustules. The disease was caused by application to the hair of paraffin oil which on chemical examination proved to contain impurity.

Synthetic Antimalarial Drugs in Chronic Discoid Lupus Erythematosus and Light Eruptions.

J. ROGERS AND O. A. FINN (*Arch. Dermat. & Syph.*, July, 1954) have treated not only patients with chronic discoid *lupus erythematosus* but also those with light eruptions of the summer prurigo type with a series of antimalarial drugs. They treated all the patients in the summer of 1952 with quinacrine and those in the summer of 1953 with chloroquine. They now present the results of treatment as assessed in October, 1953. They state that in the quinacrine series it is possible to give not only the immediate response to treatment but also the follow-up assessment a year later. The dosage of quinacrine was 0.1 gramme three times daily for one month, then 0.1 gramme twice daily for the next month, and finally 0.1 gramme daily for the remainder of the treatment period. Duration of treatment varied from four weeks (total 8.4 grammes) to 38 weeks (total 35 grammes). The dosage of chloroquine was 0.25 gramme once daily. Some patients received 0.25 gramme twice daily for a short period, but side effects were common at this dosage level. Chloroquine was given on week days only, and the majority of the patients had Saturday and Sunday free of medication. Duration of treatment varied from three weeks (total 3.75 grammes) to 34 weeks (total 42.5 grammes). Under the same dosage schedule 17 patients with light-sensitive summer eruption were treated in 1952 with quinacrine. Of these, one had his condition controlled, 12 were improved

and four were not influenced by quinacrine therapy. With quinacrine, the incidence of side effects was extremely low. Most patients exhibited staining of the skin. With chloroquine the incidence of side effects was higher. However, with a dosage of 0.25 milligramme daily, the side effects seldom interrupted treatment. Several patients taking chloroquine showed a tendency to develop furuncles and styes. It was concluded that chloroquine was as effective as quinacrine in controlling chronic *lupus erythematosus* and light-sensitive summer eruptions.

Allergic Cutaneous Vasculitis (Arteriolitis Allergica).

M. REUTER (*Brit. J. Dermat.*, March, 1953) states that in a preceding article he made an attempt to group together a number of skin disorders which were not classified or were until then unsatisfactorily defined. These disorders had in common that they all showed the clinical picture of a hematogenous disseminated eruption. Their histopathology was essentially the same. The eruptions were regarded as allergic bacterial dissemination reactions of the skin. The author also believes that the so-called cutaneous form of *periarteritis nodosa* also belongs to this group of skin affections, which he calls "cutaneous allergic vasculitis". He states that *periarteritis nodosa* shows a characteristic feature in that the medium-sized vessels with muscular walls (for example, those at the level of the cutaneous-subcutaneous border) are affected in particular. However, when cutaneous *periarteritis nodosa* was studied, a syndrome was noted in which the smaller vessels, and particularly those of the corium, bore the brunt of the allergic inflammatory reaction. The medium-sized vessels of the muscular type showed only insignificant changes or none, in contradistinction to the cutaneous vasculitis of the type found in *periarteritis nodosa*. *Arteriolitis allergica* has to be distinguished from *periarteritis nodosa*; apart from histological differences, the clinical pictures of the syndromes referred to differed correspondingly in many respects from that of *periarteritis nodosa*. The papular elements and telangiectases observed in some cases might be considered analogous to the subcutaneous nodes and *livido racemosa*-like changes seen in typical cutaneous *periarteritis nodosa*. In the case reported, the eruption was mainly localized in the extremities with only a few scattered lesions over the shoulder blades and abdomen. The lesions were densest over the knees. A conspicuous feature was the presence of papules, firm to touch and up to 15 millimetres in diameter. They were reminiscent of urticaria but were too firm and not transient enough for this. Young specimens were of a pink colour and showed a narrow erythematous zone; the older ones were more brownish-yellow. Some of the flat papules had a pinpoint-sized vesicle in the centre, while several of them showed centrally a small hemorrhagic crust. Besides the large papular elements, more or less rounded macules, light bluish-red in colour, were seen with a pinpoint papule vesicle or pustule in the centre, and some with a central hemorrhagic crust. Macular lesions

were on the lower parts of the legs and feet. Here they sometimes showed a central purpuric spot with a ring-shaped hemorrhage at the periphery. External erythematous patches with bizarre, brownish-red hemorrhages were present on the calves. Papular lesions occurred amidst these areas; they were easier to feel than see. When seen at the border of an erythematous patch, their somewhat urticaria-like aspect was clearly appreciable. The author states that the clinical picture in cases of *arteriolitis allergica* of the skin shows great variations. Apart from cases like papulo-necrotic tuberculides, eruptions of a more polymorphous nature are seen, such as erythema, papules, vesicles, pustules, maceration and necrosis, urticarial oedema, cutaneous hemorrhages, pigmentation and telangiectases. Superficial hemorrhagic and necrotic manifestations and lesions showing an urticarial component, for instance, may be of diagnostic significance in recurrent eruptions suggesting a hematogenous dissemination.

"Panthoderm."

A. L. WELSH AND M. EDE (*Arch. Dermat. & Syph.*, June, 1954) state that the response obtained by one of the authors with derivations of pantothenic acid when administered in massive doses orally in combination with vitamin E, in the treatment of certain phases of *lupus erythematosus* and of *granuloma annulare*, stimulated interest in a study of the therapeutic value of "Panthoderm" (a water-miscible cream containing 2% pantothenyl alcohol) applied topically for lesions of *lupus erythematosus*. "Panthoderm" was used topically by 26 private practice patients suffering from *lupus erythematosus*; 15 patients had the chronic discoid form, eight the disseminated discoid form. The longest period of therapy was thirteen months, the average eight months. Twenty-two patients with various phases of *lupus erythematosus* receiving massive oral dose therapy of derivatives of pantothenic acid combined with vitamin E manifested some clinical evidence of additional response when "Panthoderm" was used as a topical therapeutic adjuvant.

Effect of Topical Agents on Plantar Sweating.

W. B. SHELLEY, J. J. LARKAS AND A. STANOVE (*Arch. Dermat. & Syph.*, June, 1954) state that relatively little experimental data have appeared in the literature regarding the effects of special measures and medicaments on the normal sweat glands in the soles of men. The following procedures were tried on normal healthy young men. First, iontophoresis of anticholinergic drugs was tried, atropine sulphate being used in aqueous solutions. No inhibition could be seen in eighteen hours. In a second group, in which 1:100 scopolamine hydrobromide solution was used, no local effect on sweating could be detected in eighteen hours. The second procedure tried was the use of foot powders. Fifty subjects were tested: (a) with aluminium chloride three parts, boric acid seven parts, potassium alum ten parts, salicylic acid three parts, starch five parts and talc sufficient to make up 100 parts; (b) with

paraformaldehyde five parts and talc sufficient to make up 100 parts. At the end of two weeks, only three members of the group using powder (a) daily showed a significant reaction in the sweating rate. In none was sweating entirely abolished. In the group tested with powder (b) only four showed significant reactions. For a study on the effects of foot "soaks", three groups of 50 men were employed. The subjects stood for fifteen minutes on blotters soaked in aqueous solution of the following agents: potassium permanganate (1:5000), formalin (37% formaldehyde), ammonia water (28% ammonia). Of the foot soaks, potassium permanganate had no effect. However, a single application of formalin caused a significant reduction in sweating in 41 of the 50 men at twenty-four hours, and after one week in 17; after three weeks four still showed definite reduction in the sweat response. Ammonia water decreased the sweating in two of the 50 subjects at both twenty-four hours and one week.

UROLOGY.

Regeneration of the Ureter.

K. TRAUTNER and F. RAASCHOV (*J. Urol.*, March, 1954) state that, as a result of the D. M. Davis method of intubated ureterotomy, it should be asked what degree of regeneration of the ureteric wall takes place around such intubating tubes. In dogs, a portion of the ureteric wall representing two-thirds of its circumference, over a length of three to eight centimetres, was removed and a polyethylene tube left intubating. The kidney was not removed. The findings were as follows: (i) regeneration of epithelium was rapid, covering the entire defect within ten days; (ii) primarily the thickness of the new ureteric wall was made up of connective tissue; but (iii) muscle regeneration was not far behind—circular fibres were present within ten days, and a few days later longitudinal fibres had grown in. The authors consider that polyethylene is a very good splint material, its use being unaccompanied by any risk of calculus development.

Megaloureter.

R. M. NESBIT and J. F. WITCOMBE (*J. Urol.*, August, 1954) state that, up to the present, all theories about the cause of true primary megaloureter are largely conjectural. First of all, it is of extreme importance that any possible obstructive factor should be recognized; this would mean that some surgical method of attack should benefit the patient. Of course, it would also mean that the case was one of secondary, not primary, megaloureter. It has been thought in the past that suprapubic cystostomy might lead to decrease in the ureteric dilatation. It is probable, however, that in the cases in which improvement occurs, faulty vesical emptying function had been present, and that therefore the megaloureter condition was

again not truly primary. In the authors' experience of three recent cases, neither suprapubic cystostomy nor continuous drainage by catheter has resulted in diminution of ureteric calibre. The authors state that all three patients have continued with infection of the urine and with the same degree of ureteric dilatation. The results hoped for have therefore not been attained. In a fourth patient, no open operation has been performed; she has been clinically well and free from infection, and it appears that she has fared better than the other three. Perhaps in this disease it might be better to concentrate our therapeutic efforts along antibacterial lines and be less concerned with correction of ureteric dilatation.

Pelvic Flap Operation for Uretero-Pelvic Obstruction.

O. S. CULP and J. H. DE WEERD (*J. Urol.*, May, 1954) publish results of their observations on patients two years after a new type of plastic operation on the renal pelvis. They state that the well known Foley "Y" plasty type of operation was designed for the relief of hydronephrosis due to high insertion of the ureter into the renal pelvis. It is not so effective when the ureteric insertion is low, and especially when the ureteric constriction is a long one. In 1951 the authors published a preliminary report on a new plastic method, designed to get over these difficulties. The narrowed ureter is incised through the full length of its anterior wall. These converging incisions are made through the pelvic wall in a proximal direction. One runs from the upper end of the splint in the ureter. The other starts a little way up the pelvis wall, proximally and laterally to the beginning of the first incision, so as to form a flap with a broad, oblique base. The second incision converges to the proximal end of the first one, and meets it. The flap, which can now be turned down distally, should be slightly longer than the split ureter; its edges are sutured to the corresponding edges of the split ureter. The proximal part of the ureter is now very wide, and the gap in the pelvis is closed after a nephrostomy drain has been placed in the kidney as well as a splint in the ureter. The splint is removed at the end of two weeks, and the renal drain forty-eight hours later. The results in 27 cases are analysed. All the patients had some degree of hydronephrosis, 25 had pain, and 20 had infection. Only two patients failed to benefit by the operation, and in these cases severe ureteritis and periureteritis were present. At the final check made between six and twenty-four months after operation it was noted that 17 patients had a normal kidney and eight had shown very definite improvement, in two cases the operation had been a complete failure, necessitating secondary nephrectomy.

Undiagnosed Renal Bleeding.

A. L. FINKLE, C. L. PRINCE and P. L. SCARDINO (*J. Urol.*, August, 1954) present 19 cases of unexplained gross renal bleeding. Most were in males under forty-five years of age. Complete urological studies failed to identify the cause or the actual renal site of the

haematuria. Nine patients experienced spontaneous and seemingly complete remission without treatment. Two others were relieved, apparently as the result of eradication of "focal infection". Five nephrectomies were performed because of very profuse bleeding or suspected tumour. In none of these five specimens could a histopathological condition be demonstrated to explain adequately the renal bleeding observed clinically. No improved method of diagnosis was evolved. Conservatism, in order to avoid hasty nephrectomy, is recommended. The authors draw attention to a recent study by some Canadian workers, A. Strasberg and R. Courteau, in which six out of eight cases of unilateral renal bleeding were controlled by vitamin K therapy. The Canadian authors suggest that "prothrombin deficiencies will explain more and more of these obscure cases of renal haematuria, and fewer nephrectomies will become the rule". The present authors' experiences do not lead them to this conclusion, however, in relation to either aetiology or response to vitamin K. Indeed, recurrence of bleeding, and even de-novo bleeding from the opposite kidney, have been encountered during massive vitamin K therapy.

Adrenalectomy for Prostatic Carcinoma.

P. R. LEBERMAN, M. BOGASH, J. F. COLON and J. E. BOWERS (*J. Urol.*, August, 1954) report their results in six cases of prostatic carcinoma treated by bilateral total adrenalectomy. Five of the six patients had previously been submitted to castration-estrogen therapy. One had had no previous treatment. Objective criteria to measure the course of the disease were body weight, haemoglobin percentage, acid and alkaline phosphatase levels and the size of the primary and metastatic lesions. Five patients were living still at periods from two to twelve months after operation, and the sixth patient died at the end of three months. Excellent subjective improvement was noted in four patients, subjective and objective improvement in one, and objective improvement in two. The authors state that the other method of treatment of late reactivation of prostatic carcinoma is by using cortisone with the adrenal glands intact in order to cause functional atrophy of the adrenal cortex. Various authors have reported subjective improvement by this means. It was of shorter duration and not so complete as after adrenalectomy. No objective improvement had been observed until recently, when, in one patient unresponsive to castration and adrenalectomy, massive doses of cortisone produced temporary subjective relief, and also a drop in the serum acid phosphatase level. In the author's cases, subjective improvement following adrenalectomy did not parallel objective improvement. The authors state that a dissociation was observed between relief of bone pain and steady progression of skeletal metastases. Other investigators have noticed the same thing. Until more data are acquired and evaluated, total adrenalectomy for prostatic carcinoma remains an experimental procedure.

Medical Societies.

THE UROLOGICAL SOCIETY OF AUSTRALASIA.

The seventh annual meeting of the Urological Society of Australasia was held at Sydney from April 5 to 8, 1954.

Election of Office-Bearers.

The following office-bearers were elected for the year 1954-1955:

President: Dr. J. B. Somerset.

Past President: Dr. Colin Edwards.

Vice-President: Dr. Peter Row.

Honorary Secretary: Dr. Hugh Pearson.

Honorary Treasurer: Dr. J. W. S. Laidley.

Members of the Executive: Dr. K. L. H. Kirkland, Dr. D. C. Trainor, Dr. L. D. Wheeler.

Induction of President.

Dr. Colin Edwards inducted Dr. J. B. Somerset the President for the year 1954-1955.

The Treatment of Bladder Tumours.

DR. ROGER W. BARNES (Los Angeles) read a paper entitled "Conservative Versus Radical Treatment of Bladder Tumours" (see page 197).

DR. L. D. WHEELER (Sydney) presented some Australian hospital statistics.

DR. E. W. FRECKER (Sydney) read a paper entitled "Radiotherapy in Bladder Carcinoma" (see page 205).

DR. KEITH KIRKLAND (Sydney), in opening the discussion, said that although some surgeons were still using radical methods predominantly in the treatment of bladder cancer, recent evaluations appeared to support in most definite fashion Dr. Barnes's conclusions that more conservative surgery achieved better results. Colby's figures had pointed out the high mortality attributable to ureteral transplantation. Feasibility alone did not justify any operation. Honest belief that a condition was curable might justify a mutilating procedure; but every effort had to be made to distinguish between the growth that was local and the one that had spread beyond the proposed operative field.

Dr. Kirkland said that in his opinion, the most important and constructive approach to that subject was that of Hugh Jewett, of Baltimore. The anatomical studies of Tracey Powell, of Los Angeles, had made Jewett's deductions possible. Powell had found that the superficial or surface lymphatics of the urinary bladder were particularly scanty. On the other hand, the deeper lymphatics were large spaces with a free and unhindered circulation. He found that that distinction existed up to about half the thickness of the bladder musculature. In the superficial half the drainage was scanty, but deeper than that, the channels were large and freely communicating. Jewett, following that line of reasoning, had pointed out that the depth of infiltration meant more in prognosis than actual cellularity of the neoplasm. When the degree of infiltration was shown in a series of 80 cases to be less than halfway through the bladder muscle, 74% of the patients survived five years. When infiltration was penetrated more than halfway, 3% of patients survived for that period of time. Jewett had laid it down that when a bladder growth was palpable bimanually as a firm rubbery or hard mass, it had already infiltrated beyond halfway through the wall, and the prognosis was poor no matter what method of treatment was used. If there was doubt as to the presence of the tumour mass, it might be assumed that the infiltration in most cases was less than halfway and the prognosis so much better. That diagnostic or rather prognostic approach was by no means ultimate, but did represent a thoughtful attempt to evaluate what was one of the most dread scourges, in the whole of surgery.

Dr. Wheeler's figures, which had been gathered from the leading hospital of Australia, pointed to the gloomy position that existed at the present time in dealing with cancer of the bladder in this country. Dr. Frecker, a visitor to the Society, to whom the members were particularly indebted for his presentation, had made the forecast that as results from the surgical treatment of growths of the bladder had been so bad, development in radiotherapy held out hope that that form of treatment might completely supplant surgery, whether radical or conservative.

DR. R. J. SILVERTON (Sydney) said that he had always tended to conservatism in the treatment of bladder tumours. Apparently that attitude was encouraged by figures from the Veterans' Association in the United States of America. Over the last few years methods had changed a little, in that transurethral resection had tended to replace simple coagulation of papillomata. However, in the case of larger lesions, he preferred to open the bladder and excise them suprapubically. In selected cases the bladder incision might be closed with catgut and reliance placed on urethral drainage. It was emphasized that a number of apparently innocent papillomata might prove malignant. Dr. Silvertan added that he had always relied a great deal on the radiotherapist, whose results in his opinion were improving.

DR. J. W. S. LAIDLEY (Sydney) announced that his own opinion had changed a little during the last twelve years, and that that change had been influenced to some extent by the advent of "Pentothal" anaesthesia. Previously one had often opened the bladder to find a lesion which was incurable, and the bladder opening simply added to the patient's misery. On the other hand repeated transurethral incisions of large papillomata, which at first sight seemed almost hopeless, often gradually reduced the tumour to reasonable dimensions, and a satisfactory pedicle was sometimes found. Since the advent of thiopentone patients had not resented repeated anaesthetics, and many large papillomata had been satisfactorily treated without the bladder being opened.

DR. H. R. PEARSON (Sydney) said that despite the poor statistics he thought that there was still a place for radical surgery. Conservative surgical treatment of bladder tumours had almost reached a position of standstill and could proceed no further. On the other hand, the present bad results of radical operation could surely be reduced, at least with regard to the operative mortality. Most of the patients did not die of recurrence. Dr. Pearson showed a slide of a bladder covered with papillomata, which had been successfully removed by total cystectomy. He said that in his opinion they should first begin to classify bladder tumours in a uniform manner. He wondered exactly how Dr. Barnes assessed the degree of invasion. He then quoted the case of a female patient who, after repeated endoscopic treatment of papillomata, developed a small contracted bladder. Uretero-sigmoidoscopy was performed, and that was followed by rapid recurrence of tumours.

DR. J. BROADFOOT (Sydney) pointed out that 29 or 30 patients followed up at Sydney Hospital were untraced. He issued a plea for better records and better follow-ups.

DR. N. J. BONNIN (Adelaide) quoted seven cases in which treatment had been given by intracavitary irradiation. In the last case radio-active cobalt was used. Dr. Bonnin thought that this procedure was indicated in cases in which generalized changes were present, either radon or cobalt being used. Encouraging results were obtained in two cases. He pointed out that opening the bladder and fulgurating a growth carried a 20% mortality rate.

DR. J. B. SOMERSET (Melbourne) mentioned a case of bladder tumour one and a half inches in diameter. A two-stage total cystectomy was performed, with long intervals between the stages. On examination of the bladder the large tumour had apparently disappeared, and only a small one was found. It was a papillary carcinoma.

DR. H. N. MORTENSEN (Melbourne) said that he had encountered at least two cases in which primary malignant tumours apparently disappeared after diversion of the urinary stream. He said that from a palliative point of view transplantation of ureters and cystectomy had a definite place in the treatment of bladder tumours.

DR. B. ENDELMAN (Sydney) asked how common seedling transplants in the bowel were.

DR. R. G. S. HARRIS (Sydney) pointed out that the question of upper tract papillomata in association with bladder tumours had not been raised. He asked Dr. Frecker whether the urologist should attempt any diathermy to a bladder tumour before handing the patient over to the radiotherapist. Dr. Harris thought that any tumour which was palpated bimanually had probably spread beyond the confines of the bladder.

DR. D. C. TRAINOR (Sydney) said that the use of injections of radioactive isotopes into the prostate gland had been tried in conjunction with hyaluronidase. He asked whether that technique could be applied to bladder tumours.

DR. C. M. EDWARDS (Sydney) said that radioactive gold injected into the prostate had been employed not very successfully by Dr. O'Connor. It had been found distributed in lymphatics and lymph nodes. However, the technique

was cumbersome and the risk of injecting a vein might be considerable.

Dr. Barnes, in reply, said that Dr. Frecker had quoted a group of cases with a 55% rate of cure of the tumour following irradiation. He doubted whether the patients had been followed for long, and insisted that at least five to ten years' survival needed to be quoted. He said that Gene Hoffman, of Los Angeles, had applied X rays through the bladder kept open for a week, but the method was abandoned as being ineffective and most unpleasant for the patient. Dr. Barnes thought that perhaps not quite enough radon was used in the techniques. He thought the question of suprapubic approach as opposed to transurethral resection depended on the training of the surgeon. He himself preferred the transurethral approach, as he could see better when all the tumour was removed. For recurrences he used diathermy fulguration under "Pentothal" anaesthesia, but latterly "Trilene" had been employed as an office procedure in the case of small recurrences. He thought that the degree of invasion of a tumour was difficult to estimate and very liable to error. Any more complicated classifications—for example, those describing invasions halfway through the bladder wall—were most difficult to apply unless one performed a cystectomy.

With regard to the cure of a growth by diversion of the urinary stream, Dr. Barnes quoted experimental work by Dr. Donald Smith, of Seattle, who administered carcinogenic substances to dogs. In these animals the isolated bladder did not develop carcinoma, but if a carcinoma had already developed before isolation, then diversion of the stream caused no regression. Dr. Barnes said that he thought that seeding of tumours did occur occasionally, but not often as a result of implantation, and he agreed with Dr. Pearson that the electrolytic changes following uretero-sigmoidostomy could sometimes be alleviated. He could recall no case of an upper urinary tract papilloma following a bladder growth, though, of course, the reverse was fairly common. He had had no personal experience with radioactive substances in these cases.

Dr. Frecker, in reply, said that the figures quoted were from the Holt Institute, Manchester—they were five-year figures. He pointed out that Patterson received cases *de novo*, and that the only real figures were of that variety, not the results of "discards". The technique was comparable with the McWhirter technique for treatment of breast carcinoma. In reply to Dr. Pearson, Dr. Frecker said that he did not think repeated diathermy affected a tumour's radiosensitivity. He thought that preliminary diathermy treatment was not of much benefit; the result would be due to the X-ray therapy and not the diathermy. He thought that presumably radioactive gold gave off very little β radiation, otherwise necrosis would occur. In conclusion, Dr. Frecker said that he was sure that the place of X-ray therapy would increase, and that the older figures quoted were of little value.

Transurethral Prostatic Resection.

DR. ROGER W. BARNES (Los Angeles) read a paper entitled "The Necessity of Meticulous Technique in Transurethral Prostatic Resection" (see page 207).

DR. H. N. MORTENSEN (Melbourne), in opening the discussion, said that the resectoscope had been, and still was, one of the most lethal instruments that had ever been placed in the hands of surgeons. They knew that in the early 1930's the battle of the prostates was waged around the use of that instrument. He believed that it was only recently that the proper status of transurethral resection had become established. It had been forced on the intelligence of many people that the successful use of the instrument demanded a considerable amount of training and experience, and that for most surgeons it was a method for adoption in highly selected cases and to only the few was it a method of dealing with the vast majority of prostates in their practice. Failure to realize the potentialities for danger in the instrument had produced a host of complications with too great a frequency, and had caused the method to fall into bad repute, whereas in fact the surgeon involved should have taken the responsibility.

Dr. Mortensen then referred to the various complications that might arise as a result of lack of the meticulous care that Dr. Barnes had spoken of. He said that one thought first of the complications that might arise as a result of the introduction of the instrument. The greatest bugbear of resection was the post-operative incidence of stricture. The commonest site was probably meatal, and it had been

his experience that the tiniest breach of surface in that area might be followed by that annoying complication. The merest "hang" in the introduction of the instrument demanded a satisfactory meatotomy, and that meatotomy required the most meticulous suturing after the introduction of the catheter at the end of the operation. Dr. Mortensen said he believed that it was one of the most difficult "little" operations in surgery in which to obtain a good result. In association with the introduction of the instrument, he included the introduction of the draining catheter or Bardex bag. He believed that the Bardex bag might be responsible for quite a number of strictures along the course of the urethra, particularly if it was not kept fully on the stretch, for, as at the meatus, a very small breach of the mucosa might be followed by stricture. He could not agree with the suggestion that the use of antibiotics had an aetiological bearing on the apparent rise in the incidence of strictures. He thought one must regard all strictures as essentially traumatic in origin. The free passage of the instruments might be facilitated to a great degree by adequate lubrication. It was his practice not only to have the instrument covered in lubricant, but also to fill the urethra with lubricating solution as well, and that procedure was repeated more than once in an operation of any duration. Further back in the prostatic urethra the prostate might be perforated by the instrument; and should that not be recognized, then not only would much unresected tissue be left above the instrument, but the amount of tissue to be resected below would be correspondingly less and danger of perforation correspondingly greater. Dr. Mortensen issued a word of warning with regard to the introduction of the instrument in some cases of prostatic carcinoma. He said that the rigidity of the growth produced difficulty, which might lead to perforation of the growth by the instrument and even penetration behind the trigone.

With regard to the actual cutting portion of the operation, Dr. Mortensen said that the areas where care was particularly necessary were in the region of the twelve o'clock position, where the prostatic tissue was naturally thin, and at the six o'clock position, where detachment of the trigone might be produced, and in the region of the prostatic capsule when cutting was nearly finished. The risk of hemolysis might be great in that area, and when sinuses were opened they must be recognized immediately, the height of the irrigating level lowered, and the operation terminated as soon as possible. He did not use isotonic solutions; he still used sterile water. His experience had been that if sufficient precautions of that nature were taken, hundreds of operations would be performed without serious reactions, and the advantage in the clarity of the medium as compared to the isotonic media was very great. Dr. Mortensen seriously questioned whether the dangers of hemolysis were any greater than those arising from the uncertainty of vision and the technical difficulties occasioned by the cloudy medium of glucose or glycine.

Dr. Mortensen went on to say that perforations would inevitably occur in anybody's practice if he was performing enough resections and removing sufficient tissue, and they were readily recognizable if spinal anaesthesia was used. The patient would rarely complain of pain which was not due to perforation. It might be due to acute hyperdistension with the irrigating fluid, to an aching bladder due to persistent hyperdistension, or to spasm; but if there was any doubt about the cause, it was far better to perform what might turn out to be an unnecessary cystotomy rather than to lose a patient as a result of twelve hours' delay in the recognition of an extravasation.

Dr. Mortensen then said that he believed that the greatest difficulties in resection resulted because of inadequate or rather inexperienced attempts at haemostasis. He thought in the main that too much time was lost in endeavouring to stop bleeding from small vessels, and that to be an expert resectionist one had to develop the facility of determining what "bleeders" could be left during the operation and what must be stopped. To go over every cut as it was made was sheer waste of time, because in all probability the next cut taken would open up the same vessels; but on the other hand, it was dangerous to work in a medium which was too cloudy, and it was necessary to maintain such a degree of haemostasis as would permit ready appreciation of the tissue to be cut without waste of time in an endeavour to maintain a completely clear medium all the time. Dr. Mortensen finally said that the advice and suggestions he had to give for trouble-free resections were the following: a realization of the dangerous potentialities of the resectoscope; meticulous care in the introduction of the instruments, with adequate lubrication on one or more occasions during the operation, and including meatotomy and if

necessary perineal section; a definite scheme of attack with accurate assessment of the site and amount of tissue, hæmostasis without waste of time in the course of the operation, and an accurate appreciation of the various tissues to be cut.

Dr. V. S. HOWARTH (Newcastle) asked Dr. Barnes to comment on the disturbed anatomy of the prostatic urethra in cases of carcinoma. He wondered how far distally one might cut in such cases, and whether limited mobility, such as that produced by an osteoarthritic hip joint, would interfere with the operation. He was also interested in the posture, and wondered whether remote control electronic switches could help in difficult cases. Dr. Howarth also asked Dr. Barnes to describe his hydraulic stool. He thought that perforations were easily diagnosed, as shock and upper abdominal pain were most severe.

Dr. N. J. BONNIN (Adelaide) asked what lubricant was used. He agreed that trauma was the bugbear of resection which resulted in stricture. He had used cortisone in a few cases, 100 milligrammes being given daily for a limited period, and thought that that might help to reduce stricture formation.

Dr. E. KYLE (Perth) said that he had had little success from the use of cortisone for that purpose.

Dr. R. J. SILVERTON (Sydney) said that Dr. Barnes had described a well-nigh perfect technique. He was pleased to hear Dr. Mortensen support the use of a low spinal anæsthetic, which enabled perforation to be diagnosed. In cases of any difficulty it was better to perform a resection through a bulbous urethrotomy. That facilitated the resection, and one did not damage the urethra. Smaller resections could be performed to the urethra by the use of a small sheath.

Dr. C. M. EDWARDS (Sydney) thought it interesting that strictures should be attributed to mild trauma; previously urethrectomy had been advocated as a cure. He said that he had seen the sheath removed and replaced in order that it might be lubricated, but that seemed to him to cause more trauma than otherwise.

Dr. Barnes, in reply, said that he would like Dr. Mortensen to describe his repair of a meatotomy. With regard to carcinoma of the prostate, it was difficult to orientate oneself, and one must often guess. However, when the lumen became round the membranous urethra had been entered. Ankylosed hips, if adducted, were sometimes a contraindication to transurethral resection. He had had no experience with remote electronic control of his instrument. Dr. Barnes then described his hydraulic stool. He said that a well-known commercial version of it was available, but it was very expensive. His own original stool could be readily made by a competent hospital engineer. However, if incorrectly employed it could let one down badly on one's coccyx, which was the reason that the expensive modification was made commercially available.

Dr. Barnes said that in his opinion a perforation should be discovered long before the patient developed pain and shock. With regard to lubricants, he preferred "Metaphen" in oil. Cortisone had been employed in those cases in which the sheath was "clamped down on" during resection. Cortisone was given for from three to four weeks, and he believed that it did help to prevent stricture formation.

With regard to resection in the female, Dr. Barnes said that he had performed 75 operations over the last five years. The procedure was employed in a woman who had residual urine caused by bladder-neck obstruction. A definite collar was seen on cystoscopic examination. The distal limit of resection was hard to determine, and it was better to risk having to repeat the resection if one was in doubt, rather than do too much. The excursion of the loop in those cases was only 0.5 to 1.0 centimetres. The results on the whole had been good, including the use of the method in the treatment of neurogenic bladder. Dr. Barnes thought that perhaps urethrotomy should be performed more often before the resectoscope was inserted, and that most resectionists experienced more strictures than they cared to admit.

Dr. Mortensen then described his technique of meatotomy.

Transvesical Prostatic Adenomectomy.

Dr. R. J. SILVERTON (Sydney) read a paper entitled "The Present Status of Transvesical Prostatic Adenomectomy" (see page 210).

Dr. D. COLEMAN TRAINOR (Sydney), in opening the discussion, said that whatever the feelings of individuals might be, he thought everyone must agree that the operation of transvesical prostatectomy had stood the test of time. It had been employed for well over fifty years, and with the

Thomson-Walker or Harris refinements, or variations of them, it had given satisfying results. Even the crude Freyer technique gave better results than those who used it had any right to expect. Incredible though it might seem, that method was still referred to in the literature.

Dr. Trainor said that in the earlier years of the present century, transvesical prostatectomy was challenged by the perineal operation which was perfected and popularized by Hugh Young. His results were so good and his mortality so low that many surgeons were inspired to follow that method. However, the distribution of the two operations had always been rather geographical, and the perineal approach never became really popular in Australia or in England. The 2% incidence of incontinence of urine which followed it was, he thought, the main reason. In the 1930's came the operation of endoscopic resection, which dazzled the urological world and was to replace all other operations. Some surgeons, in fact, did become so adept at that method as to be able to remove almost the entire adenoma in most cases, and therefore continued to use it to the exclusion of other methods. However, most urologists were not so adept, and used endoscopic resection as part of their urological armamentarium rather than as an exclusive method.

The retropubic operation was rather difficult to assess. It had certain advantages. The prostate was dissected out under vision. Control of bleeding was accurate and positive. On the other hand, associated bladder conditions, if found accidentally, were not so easily dealt with as in the transvesical approach. In fact, such conditions might even be missed. The method seemed to have no advantage over the transvesical approach.

Dr. Trainor then said that there were some points in Dr. Silvertton's paper which he wished to discuss. In a two-stage operation he thought that it was unnecessary and time-consuming to expose the bladder by a layer-by-layer dissection. If the original cystotomy had been made high enough, a simple cut from the sinus downwards towards the pubis would give sufficient exposure. With regard to hæmostasis, he did not think that better control of bleeding was secured by mattress sutures; in fact, the anatomical arrangement of the blood supply to the prostate was such that a simple under-running suture was more efficient than a mattress suture.

Dr. Trainor said that Dr. Silvertton had not mentioned post-prostatectomy obstruction. It was interesting to reflect on the number of methods there were of dealing with the bladder neck. In some, such as the Harris method, the trigone was pulled down by a suture. In others, variations of the Thomson-Walker idea of cutting out a wedge of trigone were used. In still other operations the bladder neck was puckered up in such a way that one would think that the surgeon was trying to produce a constricting ring at the bladder neck. All those methods were used by surgeons who certainly would not persist in a method which did not give good results, so that it would seem that post-prostatectomy obstruction had a cause other than operative technique, and he thought that that cause was sepsis within the prostatic cavity. If sepsis occurred with the formation of scar tissue, then post-prostatectomy obstruction would follow, irrespective of the method used.

Dr. Trainor, in conclusion, said that while he was always on the side of the literary purist, he thought that it would be useless to try to alter the word "prostatectomy". It had been introduced at a time when concepts of the pathology were less accurate than they were at present, and it had been sanctioned by use and sanctified by time.

The Moving Finger writes; and, having writ,
Moves on; nor all your Piety nor Wit
Shall lure it back to cancel half a Line. . . .

Dr. R. G. S. HARRIS (Sydney) said that Dr. Silvertton had altered some of his views gradually over the years, and no doubt he would still continue to alter them a little. In his opinion a fibrotic ring was usually the result of a bad technique. In a second-stage operation dissection of the sinus was unnecessary if an incision two inches above the symphysis had been made.

With regard to hæmostasis at the bladder neck, Dr. Harris said that the sutures in the five and seven o'clock positions stopped most venous bleeding and enabled one to see any "spurters". There should be no need for such things as mattress sutures. The prostatic floor, if correctly retriangularized, was covered with a thick area of muscle and the raw area was reduced. There was more liability to fibrosis if a wedge was cut from the bladder neck. Whether or not suprapubic drainage was used was a matter of choice for the operator. If conditions were favourable, a sutured wound was much better for the patient.

DR. ROGER BARNES (Los Angeles) said that he occasionally employed a suprapubic cystostomy before a transurethral resection. They established a trocar cystostomy if the bladder could be distended. There was less danger of infection by that method than by passing a urethral catheter in many cases. However, in most cases preliminary treatment by drainage actually increased the risk.

DR. J. W. BROUGHTON (Newcastle) thought it was a wicked practice to carry out drainage for as long as six weeks, when four or five days would do. He disagreed entirely with the use of the boomerang needle, which he considered a most traumatic instrument. He was always a little doubtful about trignonization, as with any plastic operation in a septic area. However, he did agree with occasional use of the suprapubic tube for a few days, and he did not admit that the second-stage operation was less prone to produce hæmorrhage.

DR. HAROLD MOORE (Melbourne) said that he favoured occasional suprapubic drainage, though it was employed far less often than in the past.

DR. H. R. PEARSON (Sydney) said that he could not understand why perineal biopsy was performed unless the intention was to carry out a radical prostatectomy.

DR. SILVERTON, in reply, said that he was pleased to be reassured that suprapubic prostatectomy was still performed in at least 60% of cases. He was still convinced that after a second-stage operation hæmorrhage was less severe, especially if drainage had been carried out for as long as six weeks. He had not seen the fibrotic rings mentioned by Dr. Harris for a very long time. He thought the main point in excising the fistula was that the second part of the operation could be shortened through adequate access. He could see nothing wrong with cutting a broad, shallow wedge. The idea of the prolonged preliminary drainage was to allow all infiltration to settle. He wished to stress the point that during that period the patient was up and about and out of hospital. Dr. Silvertan admitted that the boomerang needle was a little more traumatic, but it was easy to use. Perineal biopsy was performed very seldom indeed, and then for the purpose of accurate diagnosis.

Acute Renal Failure.

DR. C. R. B. BLACKBURN (Sydney) read a paper entitled "The Pathogenesis of Acute Renal Failure" (see page 216).

DR. R. J. WALSH (Sydney) read a paper entitled "Blood Transfusions and Acute Renal Failure" (see page 219).

DR. ROGER W. BARNES (Los Angeles) read a paper entitled "Acute Renal Failure following Transurethral Prostatic Resection" (see page 221).

DR. B. ENDELMAN (Sydney) mentioned a case of renal failure in a woman, aged forty years, of many days' duration and with no apparent cause. The patient was finally cured by hypnosis. That emphasized the point that mental shock might be a factor.

Dr. Blackburn, in reply, said that with regard to cortisone he could quote no definite results, but its use was reasonable, as a response in the form of reduced hypertension might be expected; DOCA might be even better. Reduction of oedema by redistribution of fluid could not be explained, but apparently it preceded the diuresis by some forty-eight hours.

Dr. Blackburn said that he was not very keen on ionic exchange resins. They were difficult to use and would not go down a normal gastric tube. The average patient of the kind under discussion was vomiting, and the rectal effect was uncertain. He preferred to use glucose and insulin to control the level of potassium in the serum. Another method was administration of glucose (20% solution) through a Miller-Abbott tube into the small bowel. That induced diarrhoea without the addition of any iron, and could lower the serum potassium level in a simple old-fashioned way. He was not very keen on exchange transfusions either, as the risks involved were too great.

Dr. Walsh referred to a case quoted by Dr. Pearson, from the Royal Hospital for Women. The patient had a very low hemoglobin value (four grammes per centum). She was given a transfusion of packed red cells (to 11 grammes). There then followed a sudden increase of hemoglobin value to 20 grammes per centum, with oedema and lethargy, and exchange transfusion was not a success as blood could not be withdrawn. The chloride ions were normal. The condition was not just plain hæmodilution. With cortisone therapy she improved rapidly, and diuresis followed.

Interstitial Cystitis.

DR. J. B. SOMERSET (Melbourne) read a paper entitled "Interstitial Cystitis" (see page 222).

DR. M. S. S. EARLAM (Sydney) said that he had a number of cases of the condition, but thought that he encountered fewer than before. He had recently had his first male patient. Dr. Earlam then said that a new resident medical officer had sent for examination a number of twenty-four-hour specimens of urine, and organisms resembling tubercle bacilli were detected. The pathologist had pointed out that some smegma bacilli were both acid-fast and alcohol-fast, and the taking of a catheter specimen would obviate that error.

DR. HAROLD MOORE (Melbourne) said he thought that the disease was more common than previously.

DR. P. ROW (Brisbane) said that the condition belonged to a group of so-called collagen diseases of little understood ætiology. It was almost certainly a psychosomatic disease, and there were many points of resemblance with mucous colitis. When one understood more about mucous colitis, one would know more about interstitial cystitis, and although cortisone therapy had not been very successful so far, it was thought that that was on the right track.

DR. C. ROE (Brisbane) said that he agreed that the condition was a general disease. He thought the hormonal aspect was most important, since the disease occurred in a temperamentally difficult patient.

DR. R. G. S. HARRIS (Sydney) said that the patients were undoubtedly of nervous type. Dr. R. Noble had suggested the administration of tincture of opium in increasing doses up to 15 minims three times a day in *Mistura Gentiane Alkalina*. That treatment was continued, combined with hydrostatic dilatation with increasing strengths of silver nitrate. It required at least a month in hospital to encourage the bladder to hold urine.

DR. C. M. EDWARDS (Sydney) said that all seemed to show that dilatation of the bladder should be done with some vigour. The evidence was that those patients with bladder rupture had done the best.

Dr. Somerset, in reply, said that the object of his paper had been achieved, in that much helpful advice had been obtained from the meeting concerning a difficult and depressing condition.

Occult Carcinoma of the Prostate Gland.

DR. C. M. EDWARDS (Sydney) read a paper entitled "Observations on Occult Carcinoma of the Prostate Gland" (see page 223).

DR. H. N. MORTENSEN (Melbourne) said that he thought, while the mortality and morbidity of radical prostatectomy were so high, and while conservative treatment was so simple and reasonably satisfactory, that they had better adhere to more conservative methods, otherwise many patients would be made very unhappy to achieve an occasional cure. The first patient to whom he had given stilbestrol in July, 1942, had died just a few months prior to the meeting.

DR. ROGER BARNES (Los Angeles) reviewed 157 cases of carcinoma of the prostate. Thirty-one patients would have been suitable for radical surgical treatment. The survival rate in those early cases was 53%, which was better than the radical surgical series (50% to 56%). As far as five-year survival was concerned, palliative treatment was just as good. If it was remembered that some patients were not subjected to transurethral resection, the figures would be better still. Dr. Barnes said that their policy at the College of Medical Evangelists, as at the Mayo Clinic, was to refer the patient to a surgeon, who performed radical prostatectomy. The operation was explained to the patient, and the patient himself made up his own mind as to whether an attempt should be made at radical cure.

DR. N. J. BONNIN (Adelaide) described three radical prostatectomies performed in conjunction with Dr. G. H. Burnell. One of the patients was incontinent of urine and two were partially continent. Next one read the account of Dr. Fitzpatrick's operation. He performed a radical prostatectomy as a routine procedure, but the operation (which was performed retropubically) differed from standard procedure, in that a small fibrous cuff of prostate was left for suturing at the apex. That operation was followed by good urinary control, and should be applicable to cases of carcinoma in which the apex of the gland was not involved.

Immediate Prostatectomy.

Dr. V. S. HOWARTH (Newcastle) read a paper entitled "The Status of Immediate Prostatectomy in Hospital Practice" (see page 224).

Dr. M. S. S. EARLAM (Sydney), in opening the discussion, said that so far as the treatment of acute retention of urine by immediate prostatectomy was concerned, he thought that it was more frequently the application of the operation than the principle that was open to criticism. Wells, for instance, stated that every one of 205 consecutive patients who presented with prostatic symptoms was operated on suprapubically, none was treated by preliminary drainage, and the mortality rate was 3%. Dr. Earlam did not think that any urologist could conceive the existence of such a state of affairs in his own practice. In Wells's series there were presumably almost no malignant growths, no cases of retention of urine following recent major operation, particularly abdomino-perineal resection, and no cases in which open prostatectomy was precluded by cardiac failure, pneumonia or simple senility. One was rather forced to the conclusion that a proportion of the patients with bladder-neck obstruction admitted to the hospital in question must have come under the care of surgeons other than general surgeons. The immediate subsection to operation of every patient with prostatic symptoms of major degree, almost irrespective of any other considerations, could only be condemned. However, Dr. Howarth had not adopted that approach. He had found that no less than 24% of patients suffering from acute retention of urine were in his hands best dealt with by means other than immediate operation; Dr. Earlam thought that that statement would be substantiated by anyone in constant urological practice. Dr. Howarth had been able to carry out immediate prostatectomy in 76% of cases. His results spoke for themselves, and provided no basis for criticism of his approach. They all believed that a patient with acute retention of urine should be operated on at the earliest reasonable moment. In most cases that entailed catheterization—intermittent or continuous—until the next operating day, and in most cases no particular harm was done. However, they had all had experience of the patient who had a rigor the evening before operation, so that it had to be deferred, perhaps more than once, and they had all had patients who in retrospect would without question have been better treated by immediate prostatectomy. Dr. Howarth's approach was rather a counsel of perfection which few surgeons were in a position to adopt. The others had in general to make do as best they could; in most cases it did not matter, but in some it did, and it would; one had no foreknowledge of those in which it did matter. Dr. Howarth's selection of cases had been such that Dr. Earlam thought he knew what the answer would be; but he asked Dr. Howarth whether in retrospect he thought that in any of the cases in that category operation might have been better delayed. Dr. Earlam did not think that any of those who had not adopted that approach could reasonably offer criticism of any degree. For himself he could recall having carried out prostatectomy on only four patients with acute retention of urine, and in each case it was a most gratifying and stimulating experience.

Dr. Earlam went on to say that Wilson-Hey stressed the importance of carrying out an aseptic prostatectomy in a clean field, which had a major bearing on the post-operative morbidity. Dr. Howarth made no claims in that direction; but it had occurred to Dr. Earlam that there might be an appreciable difference in post-operative stay in hospital between patients with infection and those without infection at the time of operation. He had therefore reviewed his last 20 cases of each type in public and in private practice, and in those small series there was no major difference between the two groups (Table I). It followed therefore, as Dr. Howarth had stated, that the primary virtue of immediate prostatectomy was that it virtually eliminated pre-operative hospitalization and the headaches which were all too frequently associated with it.

So far as chronic retention of urine was concerned, Dr. Earlam said that he strongly endorsed all that Dr. Howarth had said. Years earlier he had been taught that no prostatic patient should be subjected to operation without a blood urea estimation, a phenolsulphonphthalein test and ten days' catheter drainage, otherwise the operation entailed grave risk of uræmia. Quite early in the piece, it became obvious that that pre-operative drainage was often the cause of protracted morbidity, and it was therefore in great part discarded. Then it was repeatedly observed that in a patient in the pink of condition with clear urine the phenolsulphonphthalein output was often low. The phenolsulphonphthalein test was therefore first disregarded and then discarded altogether. Again, one found from time to time that the

blood urea level was somewhat elevated in a patient otherwise apparently healthy. Rather than subject him to prolonged catheter drainage and repeated blood urea estimations, one had started to disregard the blood urea level and carry on with the prostatectomy. After it had become obvious that in an apparently fit patient the blood urea level and phenolsulphonphthalein excretion no longer had any bearing on the management, Dr. Earlam had the tests made, and for some ten years past he had not carried out any estimation of renal function whatever on the great majority of his private patients. On the public hospital side, however, the Royal Prince Alfred Hospital was a teaching hospital and students had to pass examinations; his public hospital patients were therefore treated along conventional lines. One inevitable result of that approach was that from time to time chronic retention of urine in some degree would turn up at operation as a previously unsuspected finding. Operation was proceeded with and nothing happened. Accordingly, some years earlier Dr. Earlam had commenced to operate on

TABLE I.

Type of Patient: Preoperative Drainage.	Average Age. (Years.)	Days in Hospital After Operation.
Public (catheter)	69.4	18.5
Private (catheter)	68.5	17.0
Private (no catheter)	66.5	16.0

patients with known chronic retention of urine without pre-operative drainage, provided that the clinical condition of the patient was such as not to preclude operation, and that approach he employed on every possible occasion in his private practice. In private practice, therefore, he preferred to carry out immediate operation for chronic retention of urine, while on the public side, where minimal hospitalization was in general from the personal and the economic viewpoints of less importance, his patients with chronic retention of urine were treated along conventional lines, with results that had apparently been equivalent. However, some time previously he had had two patients who made him wonder whether that was really so. They were two old men who looked well and felt well, one with acute and one with chronic retention of urine. He assured both that he thought operation could be undertaken without undue risk, and they were anxious to go ahead. He had them admitted to hospital, found that each had a three-figure blood urea level, told them that their kidney function did not enable him to proceed immediately, and instituted pre-operative drainage. For two or three weeks they bore up, but finally hope continually deferred was too much for them—they decided that there was no future for them, stopped eating, stopped drinking, and like old soldiers simply faded away. Incidentally, at autopsy one had a pair of granular contracted kidneys which no amount of pre-operative drainage would have affected. Dr. Earlam said that had he operated on those two men without previous drainage, he could not have got a worse result, and he could easily have got a better one.

Dr. Earlam went on to say that for decades past the teaching had been that immediate prostatectomy was fraught with danger of post-operative uræmia; but to the best of his belief nobody had ever demonstrated that such was the case. Uræmia in the vast majority of cases was a terminal phase of the disease, and not a complication of operation. As time went on he was becoming more and more convinced that unless it coincided with the terminal phase of the disease, post-operative uræmia occurred only as the result of oxygen deprivation of a structurally damaged renal cortex, due to hæmorrhage or to an operative or post-operative fall in blood pressure. In other words, he held most strongly that post-operative uræmia, if it was going to occur, was not preventable by pre-operative drainage.

Dr. Earlam then said that he had looked up the details of the private patients with chronic retention of urine who had come his way in the past two years (Tables II and III), and in no patient treated by operation without drainage did any clinical indication of uræmia appear in the post-operative course. Two patients during that period were treated along conventional lines, but each patient first presented in hospital with an indwelling catheter. One other patient not tabulated died from coronary occlusion. One patient was treated by pre-operative drainage for a period of six days; he had presented more or less in *extremis* as a disorientated old man with a painful bladder and a high blood urea level. It was not obvious whether his condition

TABLE II.
Transurethral Resection.

Case.	Patient's Age. (Years.)	Symptoms.	Findings in Urine.	Blood Urea Level. (Milligrammes per 100 Millilitres.)	Pathological Findings.	Days in Hospital.
I	90	Incontinence of urine.	Pus +.	57	Bar.	6
II	67	Incontinence of urine, pain.	Pus +.	178	Carcinoma.	19
III	63	Frequency of micturition.	Clear.	—	Carcinoma.	17
IV	75	Frequency of micturition, dribbling.	Clear.	56	Carcinoma.	14
V	74	Difficulty and frequency of micturition.	Pus + +.	—	Adenoma.	12
VI	67	Enuresis.	Clear.	—	Adenoma.	11
VII	60	Dribbling of urine.	Clear.	184	Carcinoma.	40
VIII	68	Enuresis, nausea, retching.	Pus + +.	135	Adenoma.	13
Average						16.5

was terminal or reversible, but after six days he was a different man, and operation was proceeded with.

Dr. Earlam, in conclusion, said that Mr. James Thurber had it that one might just as well fall flat on one's face as lean over too far backwards. He thought that since urology had become a specialty, most urologists had been leaning over too far backwards in their approach to prostatic surgery. They had, in all honesty and with the best of intentions, surrounded their prostatic patients with an aura of mystery; sometimes the aura had a faint pink coloration reminiscent of phenolsulphonaphthalein, while at other times it tended to assume a bluish tinge. He feared that they had rather dazzled themselves with science wrongly applied, and convinced themselves at times that they could save a patient from uræmia only by inflicting on him a premature infection of his urinary tract. It had, to their discredit, been largely

factory urinary output, they went ahead and operated with every prospect of success, even though the patient might have been admitted to hospital with acute retention. Such a patient would not be operated on as an "emergency", but at the next convenient operating session. In that respect he conceded that they had been moving over the years towards immediate, though not urgent, prostatectomy.

However, in recent years the operation of immediate prostatectomy had been proposed for their acceptance, and the proposal had been based on a rather dangerous ideology. The reasoning was that sepsis was one of the main hazards of prostatectomy. That was a statement which few would dispute. The next step in the reasoning, if it could be called reasoning, was stated as though it was axiomatic—namely, that sepsis was either introduced into the bladder or stirred up by the passage of a catheter, and on that flimsy foundation a whole operative technique was built up. If no catheter was passed there would be no sepsis. Something must be done about the acute retention of urine, so the only alternative was to operate immediately. The operation then took on a curious ritualism which appeared to be based mainly on superstition. Since by the rules of the game the catheter could not be passed into the bladder, after the prostate had been removed, the operator cunningly passed it from the bladder in a retrograde manner. The catheter, exerting its well-known brook-like action, swept the frustated bacteria before it towards the exterior, where they could do no harm.

When one read in the literature of the Wilson Hey operation, it was often difficult to know whether the writer was referring to immediate prostatectomy or to the peculiar ritualism with which the operation was often associated.

Dr. Trainor said that Dr. Howarth was to be complimented on his sane and cautious approach to the operation, and what Dr. Trainor had said in no way applied to him. He had used what was best in the operation and had not become enslaved by an idea, as had some others who practised that method. Furthermore, he had fitted the operation to the patient, and had not tried to fit all patients to the operation. That was shown by the fact that he had ruled out 24% as being unfit for that type of operation. The mortality in the "good risk" cases was 1%, which Dr. Trainor thought was excellent, and compared favourably with any other type of operation for such cases. In the "bad risk" cases, however, the mortality rate rose to 20%, which Dr. Trainor thought was rather high, especially when they considered that those were the patients who should have benefited most from the avoidance of catheter sepsis. He really could not subscribe to the idea that catheter drainage caused deterioration to the extent of converting a "good risk" case to a "bad risk". Patients who deteriorated with catheter drainage would probably deteriorate anyway.

Dr. E. REAY (Christchurch) said that he had tried immediate prostatectomy and had received his first setback in the form of threatened divorce; but what had really made him give it up was the morbidity. It was difficult to make out what one was dealing with. It was to be noted in the series under discussion that there were very few resections. One tended to think that the prostate was much larger than it was in cases of retention of urine.

Dr. N. J. BONNIN (Adelaide) said that he favoured bacteriological studies on the urine in many cases, but did not favour routine immediate prostatectomy, since often the patient's condition could be improved by brief periods of treatment.

Dr. ALBAN GEE (Sydney) agreed with Dr. Bonnin. He asked whether it was an aseptic prostatectomy, or just an

TABLE III.
Suprapubic Prostatectomy.

Case Number.	Patient's Age. (Years.)	Symptoms.	Urine.	Blood Urea Level. (Milligrammes per 100 Millilitres.)	Days in Hospital.
I	64	Frequency and difficulty of micturition, fever.	Pus + + +	77	20
II	60	Frequency of micturition, anorexia.	Clear.	80	16
III	72	Enuresis, anorexia.	Clear.	26	25
IV	58	Enuresis.	Clear.	66	16
V	71	Enuresis.	Clear.	27	14
VI	72	Enuresis, thirst.	Pus 1 +.	85	20
VII	59	Enuresis, thirst, anorexia.	Pus +.	103	18
Average					18.5

left to general surgeons of the order of Wilson Hey and Wells—though one could not agree with their indiscriminate surgery and complete exclusion of the transurethral approach—to "debunk" the long-accepted urological approach to prostatic surgery. Dr. Howarth's paper, in common with one or two others to which he had made reference, had placed the operation in its correct perspective. Dr. Earlam said that he could most confidently assure any of his colleagues who still treated any considerable number of their prostatic patients by pre-operative drainage that if they eliminated it as often as possible they would not regret it.

Dr. D. C. TRAINOR (Sydney) said that immediate prostatectomy had been to a certain extent an evolutionary process. In the past, rigid standards of renal function were insisted upon before operation was undertaken. To operate in less than a week after an attack of acute retention of urine would once have been regarded as folly. At the present time he did not think that urologists were less careful, but they were less exacting. For example, they did not insist on quite the same absolute standards of renal efficiency as they had once done. If a patient came into hospital in good general condition with a clean, moist tongue and with satis-

immediate prostatectomy. Dr. Gee did not share with others the horror of a catheter provided it was well managed. He still liked to estimate the blood urea content and to have the patients' condition stabilized. They certainly looked much better if prepared.

Dr. G. R. DAVIDSON (Ballarat) asked Dr. Howarth if he had not among his cases of immediate prostatectomy encountered some which would have been far better served by a different operative technique—for example, transurethral resection.

Dr. ROGER BARNES (Los Angeles) congratulated Dr. Howarth on his courage in presenting his paper, especially as in the United States there was such divergence of opinion on the subject. Dr. Barnes's own opinion was that in most cases no drainage or little drainage was needed as a preliminary. In "poor risk" cases—for example, cardiac cases—it was indicated, and also for patients with symptoms of uræmia as distinct from laboratory-tested azotæmia. Most patients "getting about" were good operative "risks" whatever their blood urea level. Dr. Barnes saw no objection to gently and carefully inserting a catheter. If there was infection, often it was in the prostate itself, and the gland was best removed early if not immediately.

Dr. Howarth, in reply to Dr. Trainor, said that Wilson Hey's classification of patients was one that he could not follow, as he mixed benign and malignant cases. Wilson Hey performed other surgical operations at the same time also. However, he was the first to be courageous enough to break with orthodoxy. Dr. Howarth said that this technique did not seem necessary. The 20% mortality rate in the chronic retention group was certainly high, and if one was really honest, he thought that that group would always have a high mortality. In reply to Dr. Reay, Dr. Howarth said that the assessment of the prostate was most difficult. The object of his paper had been to illustrate a principle rather than to advocate any particular type of operation. Probably many patients would have been better off with a transurethral resection in competent hands. With regard to prostatic abscesses, Dr. Howarth said that such patients had done well after suprapubic prostatectomy. In reply to Dr. Potts, Dr. Howarth said that the atonic bladder was found in all methods of treatment. In reply to Dr. Gee, Dr. Howarth said that he could not agree that the indwelling catheter was free of danger. In reply to Dr. Davidson, who had mentioned transurethral resection, Dr. Howarth said that he preferred an open operation, but did practice transurethral resection. Open operation was preferred whatever the size of the gland.

Pneumography and Aortography.

Dr. J. A. BLACKWOOD (Sydney) read a paper on "Second Thoughts on Presacral Perirenal Pneumography". This paper is not available for publication.

Dr. I. F. POTTS (Sydney) read a paper entitled "Further Experiences in Aortography" (see page 232).

Dr. PETER ROW (Brisbane), in opening the discussion, said that Dr. Blackwood's and Dr. Potts's reports had shown that both perirenal pneumography and aortography had become established as of value to the urologist in a few selected cases. His own experience with aortography was very limited. However, he had had a little experience with presacral pneumography. He had heard Dr. Vincent O'Connor describe his early experiences with the technique employed by Rivas at the Brisbane meeting in 1950, had tried it immediately, and had found that air did really outline the kidneys and adrenals just as Dr. O'Connor said it would. Later Dr. Blackwood's modification was tried and found to be much simpler and better. Unfortunately the radiologists had not shown any great enthusiasm for either of the methods, and they were the ones who should be most interested. Dr. Row said that one disappointing feature of presacral pneumography in his experience was an occasional regrettable tendency for the air to outline only one side. Moreover, it was the normal side which was so beautifully displayed, the abnormal side being left strictly alone.

Dr. Row then reviewed some of the radiological methods of diagnosis available to the urologist in his attempts to diagnose disease of the adrenals and kidneys. In the first place the plain X-ray film of the renal tract was not to be despised. In fact, if it was carefully interpreted and the patient was well prepared beforehand (preferably by being brought from the street without any bowel preparation at all), a wealth of information might be obtained. The kidney shadows might be so well outlined as to make perirenal pneumography unnecessary. One of the few advantages of obesity was the fact that it caused renal shadows to be distinctly contrasted with the perirenal fat. The next method

was pyelography, both excretion and ascending. (Both had been invented by Von Lichenberg, for whom they should spare an occasional thought.) By those means they might outline urine-containing or "collecting" systems. The two latest methods, those under discussion, enabled them in addition to outline renal and adrenal margins, the spleen and liver as well in the case of perirenal pneumography, and the vascular channels in the case of aortography. Further three-dimensional effects might be obtained by various combinations of those methods, limited only by the artistic taste of the practitioner and the tolerance of his patient. The indications and contraindications of those methods had been mentioned by the speakers. However, one minor contraindication might be mentioned—an understandable desire to produce fine pictures. During the trial period of those methods it was right and proper that they should be employed in a profusion of cases of all kinds; but with more familiarity one might find that in many the added information was of little practical value. Dr. Row agreed with Dr. Blackwood that the knowledge that his patient had an adrenal gland on the contralateral side must be a great comfort to the surgeon carrying out a radical operation on a renal neoplasm. He had been convinced that presacral pneumography now carried a negligible risk and did not involve a great deal of trouble. The same could not be said of aortography, which required a well-trained team of assistants, time, material, and usually a general anaesthetic, with consequent acceptance of a small though definite mortality. On the other hand, he thought that he would occasionally trust aortography to distinguish between renal cyst and neoplasm, whereas all the pneumograms in the world would still make him hesitate to treat a rounded renal tumour conservatively. However, the pneumogram really could be a great help with adrenal tumours, as was illustrated by the case of a small boy, aged three and a half years, who had a "mixed" type of adrenocortical tumour. The tumour of the right adrenal gland was clearly revealed by perirenal pneumography carried out by Dr. Blackwood's technique. It was successfully removed by Dr. K. B. Fraser, who had published the case fully elsewhere.

Dr. Row, in conclusion, said that aortography and perirenal pneumography were complementary procedures. Both had their uses in a few special cases, and their indications were becoming defined.

Dr. ALBAN GEE (Sydney) referred to cases of tumour in a cyst; he said that it was a great help to know beforehand, in order that the operation might be planned.

Dr. C. ROE (Brisbane) supported the plea for a radical approach to cysts.

Dr. J. W. BROUGHTON (Newcastle) said that he was associated with one of the pioneers of aortography, whom he had long before challenged to show films which would reveal something not disclosed by the usual diagnostic methods. That challenge had so far been unanswered. In any case, most of the conditions to which it was applied would be treated surgically, and the added information was of little value.

Dr. Potts, in reply, said that he did not wish to appear in the role of salesman for aortography. In difficult cases any method which would be of assistance was worth while. In reply to Dr. Broughton, Dr. Potts said he thought that aortography could be of value pre-operatively in nephropathy, as it could demonstrate the length of the pedicle. In cases of aberrant vessels it was helpful to know beforehand their number and size.

A Table for the Cystoscopy Room.

Dr. NOEL J. BONNIN (Adelaide) read a paper entitled "A Table for the Cystoscopy Room" (see page 233).

Correspondence.

ANÆSTHETICS AND GENERAL PRACTICE.

SIR: I have read with interest the articles and correspondence on anaesthesia. There are many country practitioners who over periods of more than thirty years have given literally thousands of anaesthetics without a fatality. It may have been more good luck than good management, and apparently we have been taking grave risks.

I have not seen the use of chloroform mentioned in the discussions, but we were taught to use this drug in the

Melbourne Hospital forty years ago, and I still find that it gives the patient a smooth induction, and the transfer to open ether is easy. It is also most useful in midwifery where a quick short-acting anaesthetic is required in the second stage.

The young graduates now seem to have no idea how to give the simplest of anaesthetics, and are so scared that they are difficult to teach.

Surely students could be taught how to maintain an efficient airway, how to watch the patient's colour, pulse and respirations, and the place of premedication. When students and residents can give satisfactory anaesthetics by the despised rag and bottle method, or with simple ether machines, they can meet most of the requirements of general practice.

Yours, etc.,

ELLEN M. KENT HUGHES.

Armidale,
New South Wales,
January 22, 1955.

THE IDEAL EXERCISE.

SIR: Although in my eighty-ninth year, I still follow the advice given me some fifty years ago by that warrior Scot Skirving, to read my journals regularly from cover to cover. The journals concerning me are the Australian and the British. And so I had the pleasure of reading on Saturday last the leading article on "The Ideal Exercise".

May I ask if the writer of that leader is a fencer? His sentence: "Too often . . . in fencing is the right arm given an overwhelming preponderance of action." One can read into this that the writer is of the opinion that such preponderance should not be given. This recalls to my mind a little episode of some years ago. In reference to a life insurance I had to submit to an examination by a colleague. "Finckh", said he, "I did not know you were left-handed." Said I: "What do you mean? I am not." Said he: "Your left arm is better developed than your right." Hence the inference. I then explained to him that for more than twenty years I had been instructing and demonstrating fencing on classical lines. On those lines more work is thrown on the left arm than on the right. When on "guard", the left upper arm is strictly raised horizontally backwards, while the left forearm is held strictly vertical, while the left hand is allowed to drop quite loosely towards the head. To keep the left arm constantly in that position requires an amount of muscular training which "too often" does not suit the careless fencer. Hence my beautiful biceps which puzzled the examiner.

But, of course, if the writer of the leader is not a fencer, I shall not expect him to take any notice of this.

Yours, etc.,

ALFRED E. FINCKH.

5 Kirkoswald Avenue,
Mosman,
New South Wales.
January 25, 1955.

MEDICAL OFFICERS ON SHIPS.

SIR: I should like to raise the matter through your columns of the employment by shipping companies of non-uniformed doctor holiday-trippers in place of the ship's surgeon—a Merchant Service post that has been in existence since the time of Drake and before—thus excluding from employment the regular surgeon, whether Australian or British. The situation is satisfactory from one point of view only, that of the holiday-tripper himself, and justified from none. Can one imagine a shipping company carrying an accountant on a holiday trip or giving him a free passage in exchange for his services as a purser? Or a telephonist as a non-uniformed radio officer? Why then should the surgeon's position be treated with such offhand casualness? Further, a doctor dressed as a passenger and not as a ship's officer will inevitably think of himself as a passenger, and, in the main, act accordingly, a situation unsatisfactory from the point of view of the master and the crew. Is there any other profession that would permit the encroachment of an amateur (from the nautical point of view) into its jobs? The biggest lines do insist on uniform, and then if a man is doing a single trip it is not noticeable, but too many lines do not. Again the Merchant Navy surgeon, Australian or British, is debarred from posts on the Australian run of the Port Line, Blue Star Line and

China Navigation Company. I believe it is true to say that the first two never pay a regular surgeon on this run, but rely on the doctor's wanting a free passage to the United Kingdom and back, while the latter employs holiday-trippers on its best ships, and pays them the same as the few regular surgeons it employs on its pilgrim and cargo ships—in some instances even pays them more.

Casual labour inevitably brings the profession of the Merchant Navy surgeon into disrepute, promulgating the idea that anything is good enough for that job, and there are many doctors today who wish to make the sea their career. As the Medical Association tends the interests of doctors in other spheres, may I suggest it now turns it gaze upon this problem. Let free passages for doctors home be given only by ships not compelled by law to carry a surgeon; cargo boats are often glad enough to have a doctor on board on a long voyage; and let it insist that if a company employs a single tripper, that he be compelled to wear uniform and be part of the ship's company; this would keep out the man who intends solely to have a holiday and would retain those who were keen on the sea life, although for most of the year involved in a different career, otherwise the regulation of the National Maritime Board is fulfilled in letter only and not in the spirit.

Yours, etc.,

MICHAEL DILLON, M.A. (Oxon.),
M.B., B.Ch. (T.C.D.), Surgeon,
M.N.

C.O. G. S. Yuill and Company, Proprietary, Limited,
6 Bridge Street,
Sydney.
January 21, 1955.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

MEDICAL ADVICE FOR A GOVERNOR.¹

Andrew Gibson to Sir Richard Bourke.

Tirranna, July 22, 1833.

My Dear Governor,

By your obliging favour of the 15th inst. I am at last in possession of the account which I have been for some time anxious to obtain regarding the state of your general health and the result of the late treatment pursued for the recovery of your thumb. With respect to the weakness still felt in the thumb it is probable that it may be partly the effect of the blister which was a severe one, after a little time when the immediate effect of the vesication subsides the joint will regain its natural strength and I trust that the swelling and inflammatory tendency is removed—the cold weather at present, together with the state of your general health may also contribute to keep up pain and irritation in the joint. After the tenderness from the blister has perfectly healed I think the iodine should again be employed—until then do nothing further to it but keep it well covered and warm.

With respect to the hip there is no doubt that it is also more or less influenced by the state of your Excellency's general health and by the weather. The stiffness and pain about and under the joint are certainly rheumatic symptoms—but nothing more—they are almost unavoidable sequelae of injuries to the joints—and fully satisfied as I am that the structure of the joint itself is in every respect sound and perfect, I may venture to assure your Excellency that the present symptoms will disappear upon the return of warm weather and when circumstances permit of improvement in your general health. The sensations experienced across the thigh, in the course of the sartorius muscle are however not altogether rheumatic: a little injury was done to the muscle here and it may be still weak. I think therefore that the application of the Flannel Roller again would improve and strengthen this part. As to the hip itself frictions with warm Oil, additional warmth by

¹ From the original in the Mitchell Library, Sydney. Andrew Gibson (1796-1840) was present at the Battle of Waterloo. He was for a time Assistant Colonial Surgeon in Sydney. He took up the Tirranna property in 1828 and was keenly interested in the development of the area.

Flannel and occasionally the hot bath are the only local means at present advisable.

Taking your Excellency's case altogether, it is obvious that attention to the general health is the only indication—with a view to benefit both those local affections and nervous feelings. The latter are evidently aggravated if not caused by constant application to business, confinement and consequent indigestion especially after late dinner hours. I do not however agree with your Excellency in believing that these symptoms (nervous) are so permanently fixed—perhaps they will always recur when there is the same cause to produce them—but if I remember well your Excellency was free from them last Summer when residing at Parramatta under somewhat different circumstances as to dieting and business—we may therefore expect that a change of residence and plan of living will again remove them.

I am also in hopes that something may be done to alleviate those nervous sensations by the use of a little medicine, and in the meantime until a change can be conveniently effected in your mode of life I would earnestly advise the use of some aperient. Your Excellency is aware, I believe, that I am not in general an advocate for too much physic—but in the present instance I feel it my duty to advise a trial of it. I must also advise your Excellency that the occasional use of the Hot Bath, about 90°, at bedtime will be of benefit to the general health and at the same time serve those local affections. Notwithstanding that I anticipate benefit to your Excellency from the plan of management above advised I must still beg of you to take the earliest opportunity of resuming your former arrangements at Parramatta—and I also trust that you will embrace every opportunity in your power of travelling. I rather think that your Excellency may often be exposed to cold and winds—the latter you should particularly guard against, as they become severe towards the spring season. Your Excellency will receive a supply of the dinner pill with directions for their use; two or three are generally taken just before dinner; and after giving them a trial I beg you will let me hear the result, and a further account of your health as soon as you deem it necessary or convenient.

In reply to your Excellency's enquiries after the progress of the Hospital, I beg to say that the walls are partly up, and the most of the material drawn to the spot, after a long carriage of twelve miles. Many difficulties, almost unforeseen, arise in the Bush to delay buildings, I have been unlucky of late, my Carpenter got drowned in the Pond, my Stonemason has absconded, and other evils of minor kind have in some degree obstructed my work, but still I am in hopes of completing the Hospital in as short a time as Your Excellency would fairly expect. Other matters go on very quietly with us at Goulburn. . . .

Entreating your indulgence for my intrusion with so long a letter,

With sincere respect,

Your faithful servant,

ANDREW GIBSON.

Obituary.

WILLIAM ERIC GIBLIN.

We are indebted to Dr. Carl Gunther for the following account of the late Dr. William Eric Giblin.

William Eric Giblin was born in 1884. He graduated at the University of Sydney in 1908, and became a resident medical officer at Sydney Hospital. In 1911 he joined the Papuan Medical Service as District Medical Officer at Samarai. His district extended in all directions for as far as he could go in his whaleboat with its native crew of six. Eric kept that whaleboat fully stocked and ready, and the whole district knew for certain that whatever the weather and however far the trip, the doctor would come at once when called.

When the first World War came, Eric enlisted, and served with distinction as a regimental medical officer; he was awarded the Military Cross. After demobilization he returned to Samarai, and married. He had met his wife when she was nursing at Sydney Hospital; she also had enlisted and served abroad with the Australian Imperial Force. Now the whaleboat was replaced by a sturdy launch; the district developed, and its population increased. Eric's work was much heavier, and extended over an ever-increasing area, but his unlimited energy was a byword—only the toughest could keep up with him. His contribution to the welfare of

eastern Papua was tremendous, and he was widely respected and admired by both whites and natives. He had a terrible shyness, and found it an agony to make close friendships, but in spite of this, and a fiery independence, he always had hosts of true friends. Professionally he was a keen and accurate diagnostician, he had a wide range of knowledge which he faithfully kept well up to date, and he was a conscientious and painstaking physician and a deft and competent surgeon. He was a good colleague. He was an excellent swimmer and played a strong game of tennis and golf; he was a fine pianist. During this Samarai period his two sons, now both practising at Sydney, were born.

In 1930 he was transferred to Port Moresby, and shortly after became Principal Medical Officer for Papua. In 1935 he completed his term of service and was retired, but he could not settle down in Australia; and in 1937 he returned to Wau as medical officer for New Guinea Goldfields, Limited. After two years there he moved to Papua, and the strenuous existence of field medical officer for the Australasian Petroleum Company. In 1941 he wrote to me, in typical style: "I shall be glad to help you out. Since they will not have me in the army (they say I am too old), I feel that by taking over and letting you get away I shall be doing something useful by way of my war effort." So he came to Bulolo. He was indispensable, and apparently oblivious of Japanese bombing; when finally ordered to leave, he went under protest, and shared the arduous trek to Port Moresby with a party of much younger men.

He was in practice at Gosford for a time, and then joined the Allied Works Council and served in the Northern Territory. But by late 1944 he had wangled his way back to New Guinea; there he appeared to have a free-lance sort of job, always moving to where there was the most work and trouble—he is known to have walked the Kokoda Trail at least three times.

In 1946 he rejoined the Papua-New Guinea Medical Service; he was stationed for three years at Wau, and was then moved to the Central Highlands, where he was occupied in the development of medical outposts. In 1953 he lost his wife. By then, too, he had slowed down—he had developed some form of cardiac embarrassment, and could no longer stride up New Guinea's steep mountain-sides with his former vigour. Finally he retired; but after only a few months at his home at Wahroonga, he died quietly in his sleep.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 77, of December 23, 1954.

AUSTRALIAN MILITARY FORCES.

Citizen Military Forces.

Northern Command: First Military District.

Royal Australian Army Medical Corps (Medical).—1/25222 Captain (provisionally) B. Bruce-Smith ceases to be seconded for post-graduate studies in the United Kingdom, 15th November, 1954. F1/1008 Captain (provisionally) P. I. Evans relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (1st Military District) in the honorary rank of Captain, 1st October, 1954. To be Captain (provisionally), 11th November, 1954: 1/46764 Allan James Kerr.

Eastern Command: Second Military District.

Royal Australian Army Medical Corps (Medical).—The provisional rank of 2/130107 Captain C. B. Saunders is confirmed. 2/152043 Captain J. Laing is appointed from the Reserve of Officers, 10th September, 1954.

Southern Command: Third Military District.

Royal Australian Army Medical Corps (Medical).—The provisional rank of 3/157156 Captain R. M. Gray is confirmed.

Central Command: Fourth Military District.

Royal Australian Army Medical Corps (Medical).—The provisional ranks of the following officers are confirmed: Captains 4/32036 T. H. Beare, 4/32049 J. B. Murchland and 4/35404 J. D. Lister.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

2nd Military District.—To be Honorary Captain, 18th October, 1954: James McRae.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

The resignation of Flight Lieutenant K. W. F. Chambers (052758) is accepted, 29th October, 1954.

The resignation of the following officers is accepted: Flight Lieutenant F. O. P. Pearce (039510), 10th November, 1954; Flying Officer W. J. Slaven (052749), 15th November, 1954.

Active Citizen Air Force: Medical Branch.

No. 22 (City of Sydney) Squadron.—Bevan Leslie Reid (0211584) is appointed to a commission, 11th September, 1954, with the rank of Flight Lieutenant.—(Ex. Min. No. 130—Approved 15th December, 1954.)

Air Force Reserve: Medical Branch.

The following former officers are appointed to a commission, with the rank of Flight Lieutenant: H. Borkman (025627), 19th June, 1954, T. C. Wall (035953), 4th September, 1954.

The following are appointed to a commission with the rank as indicated: (Flight Lieutenant (Temporary Wing Commander)) Stephen Creighton Suggitt (277625), 24th August, 1954; (Flight Lieutenant) Robert John Limbury Tebbutt (0211575), 12th June, 1954.

The following Air Cadets are provisionally appointed to a commission, 24th June, 1954, with the rank of Pilot Officer: A35279 Bryan Ebert (035279), A37851 Barry Duncan Preston (037851).

Flight Lieutenant (Temporary Wing Commander) R. L. T. Grant (1185) is placed on the Retired List, 21st July, 1954.

Australian Medical Board Proceedings.

QUEENSLAND.

The following have been registered, pursuant to the provisions of *The Medical Acts*, 1939-1948, as duly qualified medical practitioners: Cole, Alastair Charles, M.B., B.S., 1952 (Univ. Melbourne); Cole, Dorothy Merle, M.B., B.S., 1952 (Univ. Melbourne); Stephen, Bruce Smith, M.B., Ch.B., 1951 (Univ. Aberdeen); Hales, George Robertson, M.B., Ch.B., 1938 (Univ. Edinburgh).

The following additional qualification has been registered: Harrison, Mark Robin, D.O. (Univ. Melbourne), 1954.

TASMANIA.

The following have been registered, pursuant to the provisions of the *Medical Act*, 1918, as duly qualified medical practitioners: Short, Donald Wheeler, M.B., 1951 (Univ. Sydney); Sinclair, Doris Elizabeth, M.B., B.S., 1954 (Univ. Melbourne); Crosby, William Moncrieff, M.B., B.S., 1954 (Univ. Melbourne); Nicholson, Margaret Faith, M.B., B.S., 1954 (Univ. Sydney); Grounds, Michael Donal, M.B., B.S., 1954 (Univ. Melbourne); Woodforde, John Marcus, M.B., B.S., 1954 (Univ. Sydney); Dixon, George Evan, M.B., B.S., 1954 (Univ. Sydney); Wagner, Gerhardt Richard, M.B., B.S., 1954 (Univ. Sydney); Nestel, Paul John, M.B., B.S., 1954 (Univ. Sydney); Lustig, Fred Walther, M.B., B.S., 1954 (Univ. Melbourne); Pyper, Joanna Francis, M.B., B.S., 1954 (Univ. Melbourne); Goldstein, Alexander, M.B., B.S., 1911 (Univ. Melbourne); Posen, Solomon, M.B., B.S., 1954 (Univ. Adelaide).

The following additional qualification has been registered: Reid, John Scott, M.R.C.O.G., 1949.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JANUARY 15, 1955.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism ..	2(1)	1(1)	4	..	1	..	..	..	8
Amoebiasis	2	..	..	..	..	..	2
Ancylostomiasis
Anthrax
Bilharziasis
Brucellosis
Cholera
Chorea (St. Vitus)
Dengue
Diarrhoea (Infantile) ..	2(2)	17(12)	3(3)	..	4(4)	..	..	2	28
Diphtheria	1(1)	3(3)	..	10(8)	..	..	..	14
Dysentery (Bacillary)	11(7)	..	8(8)	..	..	..	19
Encephalitis	2(2)	..	..	..	..	..	..	2
Filariasis
Homologous Serum Jaundice
Hydatid
Infective Hepatitis ..	62(35)	49(33)	..	4	2(1)	..	2	1	120
Lead Poisoning	2	..	..	..	..	..	2
Leprosy	4	..	1	..	5
Leptospirosis
Malaria	1(1)	..	..	..	..	..	..	1
Meningococcal Infection ..	1	2(2)	..	..	..	..	..	..	3
Ophthalmia
Ornithosis
Paratyphoid
Plague
Polio-myelitis ..	2(1)	8(6)	8(1)	1	3	1(1)	..	..	23
Puerperal Fever	1	..	..	..	..	..	1
Rubella	20(8)	..	..	12(10)	..	..	..	32
Salmonella Infection
Scarlet Fever ..	5(2)	17(10)	4(1)	2(2)	3(2)	..	..	..	31
Smallpox
Tetanus	1(1)	..	..	..	1
Trachoma	2(1)	..	..	..	2
Trichinosis
Tuberculosis ..	39(35)	17(13)	7(1)	11(7)	15(13)	5(2)	3	..	97
Typhoid Fever ..	2(2)	..	..	..	..	1	..	..	3
Typhus (Flea-, Mite- and Tick-borne)
Typhus (Louse-borne)
Yellow Fever

¹ Figures in parentheses are those for the metropolitan area.

Nominations and Elections.

THE undermentioned have been elected as members of the New South Wales Branch of the British Medical Association: Brenner, Leonard, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Chapman, David Bruce, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Chapman, George Keith, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Chia, William, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Cruikshank, Nellie Marian, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Don, Ronald Alexander, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Douglas, Bruce Stuart, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Elliott, Francis Maxwell, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Glenn, David Campbell, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Hart, Robert Mercer, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Harvey, Francis John, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Harvey, Patricia Mary, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); McArthur, Richard James, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Morgan, John, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Muscio, Peter Allan, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Newman, Rohma, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Pacey, Spencer Milverton, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Peters, Harry, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Poate, William James, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Purser, Brian Normand, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Ryan, William Philip, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Scougall, James Selwyn, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Shenstone, David Beverley, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Solomon, Herbert John, junior, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Taylor, Thomas Kinman Fardon, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Tents, Renl Wuu, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Watson, John Glenton, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Wiles, Angus Neil, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Wright, James Edwin, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Wright, John Saxon, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Yeomans, Nevill Thomas, provisionally registered, M.B., B.S., 1955 (Univ. Sydney); Brennan, Maurice Joseph, M.B., B.S., 1954 (Univ. Sydney); Cappe, Philip Francis, M.B., B.S., 1954 (Univ. Sydney); Gaal, Robert James, M.B., B.S., 1954 (Univ. Sydney); Kelly, William Mortimer, M.B., B.S., 1954 (Univ. Sydney); McKinnery, Ambrose John, M.B., B.S., 1954 (Univ. Sydney); Mansfield, Colin Harrison, M.B., B.S., 1954 (Univ. Sydney); Shaw, Patrick Lalor Rodas, M.B., B.S., 1954 (Univ. Sydney); Harris, Henry Guy, M.B., B.S., 1953 (Univ. Sydney); Hirst, Edmond, M.B., 1945 (Univ. Sydney); Maguire, Barry Bernard, M.B., B.S., 1953 (Univ. Sydney).

Deaths.

THE following death has been announced:

MEAGHER.—Francis John Meagher, on January 26, 1955, at South Yarra, Victoria.

Medical Appointments.

Dr. J. B. Hawke has been appointed registrar in clinical pathology at the Royal Adelaide Hospital.

Dr. R. S. Colton has been appointed honorary clinical assistant to the medical section of the Royal Adelaide Hospital.

Dr. D. S. Kidd has been appointed honorary clinical assistant to the surgical section of the Royal Adelaide Hospital.

Dr. R. A. Barter and Dr. R. G. Gold have been appointed honorary clinical assistants in pathology at the Royal Adelaide Hospital.

Dr. T. K. Abbott, Dr. J. Downing and Dr. Joyce Margaret Ford have been appointed to the Department of Public Health of New South Wales.

In pursuance of the provisions of *The Cremation Acts*, 1913 to 1935, of Queensland, approval has been given for the issuing of licences to the following: Dr. A. F. Knyvett, Dr. G. B. Ilett, Dr. G. A. Hocker and Dr. B. E. E. Hirschfeld, authorizing them to sign permissions and certificates for cremation, and to grant permission to cremate any human body after death.

Under the provisions of the *Quarantine Act*, 1908-1950, Rex Richard Ashby Brock, William James Charlton and Merna Alma Mueller have been appointed Quarantine Officers at the Northern Territory, Newcastle and Thevenara (South Australia) respectively; and Donald James Wurth, Max Anthony O'Halloran, George Kenneth Vincent, Bruce Forsyth Gates and John Raymond Walsh have been appointed Quarantine Officers at Botany Bay.

Dr. K. V. Sanderson has been appointed honorary clinical assistant to the dermatological section, Royal Adelaide Hospital.

Dr. F. A. Dibden has been appointed assistant director of the radiotherapy department, Royal Adelaide Hospital.

Dr. Marjorie Phyllis Casley Smith has been appointed principal medical officer for schools in the Public Health Department of South Australia.

Diary for the Month.

- FEB. 14.—Victorian Branch, B.M.A.: Finance Subcommittee.
- FEB. 15.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- FEB. 16.—Victorian Branch, B.M.A.: Branch Meeting.
- FEB. 17.—Victorian Branch, B.M.A.: Executive of Branch Council.
- FEB. 22.—New South Wales Branch, B.M.A.: Ethics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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